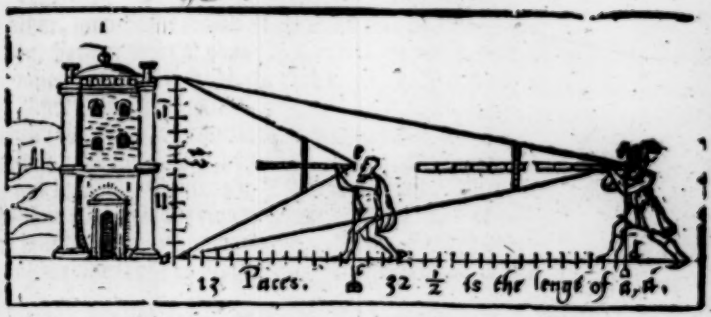
A BOOKE NAMED TECTONICON,

Briefly shewing the exact Measuring, and speedie reckning all manner of Land, Squares, Timber, Stone, Steeples, *Pillers, Globes, &c. Further, declaring the perfect making and large vse* of the Carpenters Rule, containing a Quadrant Geometricall: comprehending also the rare vse of the Squire. And in the end a little Treatise adioyning, opening the composition and appliancie of an Instrument, called the profitable Staffe. With other things pleasant and necessary, most conducible for Surueyers, Landmeaters, Ioyners, Carpenters, and Masons.

Published by LEONARD DIGGES *Gentleman, in the yeere of our Lord,* 1556.

Geo. Palmer bought 1637



AT LONDON
Imprinted by *Felix Kyngston*, and are to be sold by *Robert Allott*, at the signe of the Grey-hound in Paules Church-yard. 1626.

How to measure all manner Triangled Land.

The iij. Chapter.

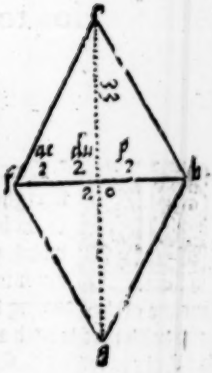
IF thou bee an Arithmetician, multiply this streight hanging line, drawne, as aboue is shewed, in halfe the number of Pearches of that side, which it cutteth squirewise. For want of the knowledge, take the aforenamed Pearches (I meane of the hanging line, and halfe the side which he cutteth) and with that length and breadth enter your Table of account, as there is set forth. So shall ye perceiue the number of Acres, Roodes, Dayworkes, &c. Euclid the 1. Booke 41. pro.

Example.

FOr the perfect measuring of Triangles afore figured, and all other, suppose the second of these last nine figures of the other side, having written about it a. b. c. d. to bee a piece of Land, whereof I would haue the true measure, I finde by a Cord, otherwise, the pricked hanging line a. b. to bee 23. Pearches: the side b. c. which it cutteth squirewise 44. Pearches: whole halfe is 22. With those 22. and 23. the conuenient length and breadth, I enter the Table of account. There I finde by that Table, at the corner where both the lines of conuenient length and breadth doe meete, 3. Acres, 6. dayworks, and two Pearches to be in that Triangle. Thus of all before figured.

Here note your Table must euer bee entred with all the Pearches of the hanging line, and with halfe the side that hee cutteth squirewise. Or with the halfe hanging line, and the whole side cut. This table followeth.

A figure of a double Triangle.

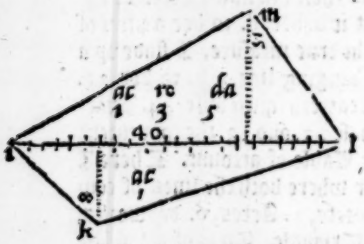


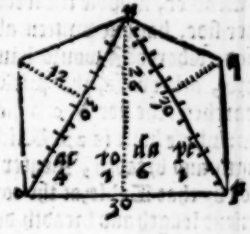
THis figure c. f. g. h. is but two Triangles: and therefore measured as aboue in two parts. Or thus: The hanging line, e. g. is 33. Pearches: the side f. h. that he cutteth squirewise 20. Pearches, the halfe of the which is 10. Now enter your Table as afore, with 33. and 10. the conuenient length and breadth. So shall ye finde two Acres, two Dayworkes, and two Pearches, the true content of this figure c. f. g. h.

Another example.

Figures of many Angles.

ADmit i. k. l. m. Land to bee measured. Because it is no manner Triangle, it must be brought by imagination, as I haue said, into a Triangle or Triangles. Which imagination is here signified by the line dashed i. l. Then as aboue is





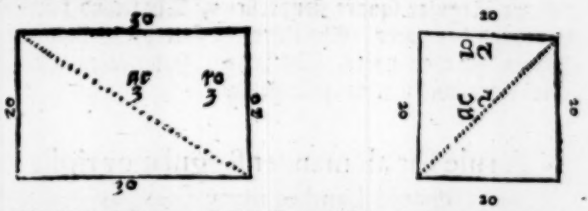
declared, it ought to bee measured (according to the rule of Triangles) in two parts, because there are two Triangles in that land. So by proofe ye shall finde in the vppe i. m. l. one Acre, 3. Roodes, and fiue Daywoorks: in the other i. k. l. one Acre. Thus I gather the whole content of that Land, to be two Acres, three Roodes, and fiue Daywoorks.

None

None otherwise of the adioyned n. o. p. q. and all other figures following: and other whatsoeuer they are, that by any meanes may be brought into Triangles.

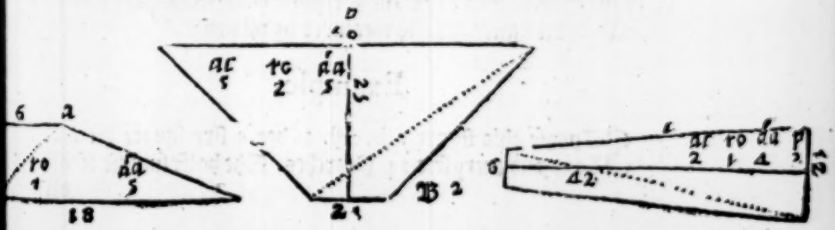
Furthermore know that the figure i. k. l. m. is readily thus measured. Adde the Pearches of both the hanging Lines together: so haue yee 23. With this number, and with halfe the Pearches of the side, i. l. which bee cutteth squirewise, being 10. Pearches, enter your Table. So is found as afore.

These two figures following may also bee thus measured, otherwise then by the rule of Triangles. Enter your Table with their conuenient length and breadth. So shall you finde the contents of all such.



These three figures following, although they may be measured by the rule of Triangles, yet for quicker speede, they haue also their proper measuring as ensueth.

Lay together the two sides which are parallels of the first figure a. that is 6. and 18. making 24. the halfe is 12. the breadth 5. Enter with 5. and 12. your table. So haue you one rood, and fiue dayworks. For the other two b. c. and such like, ioyne the heads or ends in one: and enter your table with halfe of those Pearches, and with the whole number of the middle line.



How by supputation to measure all triangled Land.

To measure triangled land by supputation.

IOyne all the sides together: take halfe out of that halfe, pull every side, noting the difference. Then multiply the differences, the one in the other, and the third difference augment in the product. That which encreaseth, multiply in the halfe of all the sides ioyned. Then the Radix of the surmounting summe is the content of that Triangle.

Foure rules following.

Now rest foure Rules to bee treated of. The first for all manner Regular square Superficies. The second for round Land, and her parts. The third for Steeples, Columnes, Globes, and their parts. The last for Mountaines and Vallepes. Here they shall in order follow.

A rule for all manner Regular or right squared Land of many sides, as 5.6.7.8.9.10.20.100, &c.

The iiij. Chapter.

To measure land of many sides.

MEasure and lay all the sides together, taking the halfe number of Pearches there contained. Then draw a right hanging line from the Center or middest of that figure, or the middest of some one side: And with that length and the other, enter your Table. Note that the Triangle of all sides like, and the Quadrate figure are also measured by this rule.

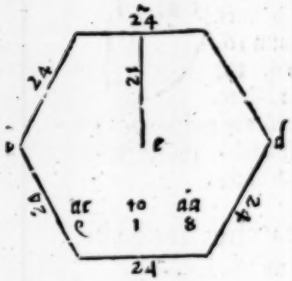
Example.

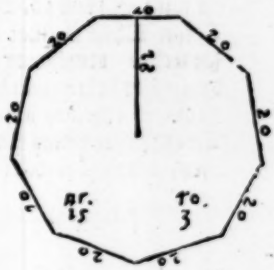
SUppose this figure a.b.c.d. to bee a fire square piece of Land, and every side 24. Pearches. The halfe summe of all

all

all sides is 72. Pearches: the right hanging pricked line a. c. 21. Pearches. With these two numbers ye must enter your Table of account following hereafter; and doe as is opened in the declaration there adioyned, when Numbers surmount the Table as they doe here.

So shall ye finde 9. Acres, 1. Rood, and 8. Dayworkes, the content of this figure a. b. c. d. Euen thus is the other nine squared figures measured, and such like.





A Rule for round Land, and the parts thereof.

The v. Chapter.

HAlfe the Diameter multiplied in halfe the Circumference, sheweth the content of any Circle. Archimedes in libello circuli mensurationis.

Or thus more plainly: Ye shall enter your Table with halfe the number of Pearches of the whole Circumference or compasse, and with the number of halfe the Diameter or breadth. So haue yee the content.

Ensample.

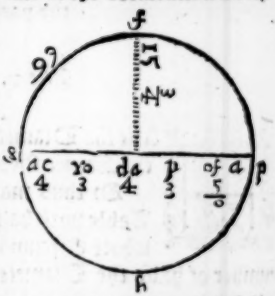
SUppose a piece of land, whereof the compasse is 100. pearches, the breadth 32. Pearches, I would know how much Land is in this figure. Enter your table with halfe the compasse, that is 50. and with halfe the breadth, that is 16. Pearches. Because in the table I cannot finde 50. for the greatest length is 40. (therefore I enter with 40.) and 16. So is found foure Acres. Then I enter againe with 16. Pearches remayning, and 16. the breadth, as before, that bringeth 1. Acre.

Now to conclude by addition of one and foure, I finde fine Acres in that round Land, whose halfe compasse is fifty Pearches, and the breadth sixteene Pearches.

How parts of Pearches are to be counted in measuring.

FOr perfect knowledge and vse of this table following, when parts of Pearches are adioyned, note well this other example that ensueth, and also what is said of the declaration annexed vnto the table, when parts of Pearches are in the length, breadth, or both.

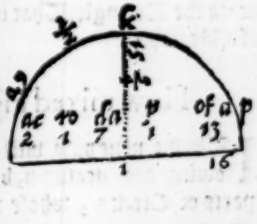
Imagine f.g. h. to be a round piece of Land: I finde by measure the whole compasse, 99. Pearches. The halfe is 49. $\frac{1}{2}$. The hanging Line or halfe breadth is 15. $\frac{3}{4}$. Enter your table with the whole Pearches, that is 49. and 15. leaving out $\frac{1}{2}$. and $\frac{3}{4}$. which were but parts of Pearches. So haue ye



ye 4. Acres, 2. Roods, 3. Daywozkes, and 3. Pearches. Foz those parts of Pearches omitted, at your first entring the table, wozke thus: The halfe Pearch, Quarter, oz other part of a Pearch in the length, must be reckoned by themselues in the whole breadth, and those of the breadth contrariwise in the length. If there be such odde parts in both, then reckon them of the length in the whole breadth, and them of the breadth in the whole length, ioyning to the other afoze-gotten, remembzing the pzoduct of the one fraction multiplied in the other, to bee pulled from the encrease. To make this matter plaine, I will take this last example befoze. The one number wherewith I should haue entred my table, was 49. $\frac{1}{2}$. the other 15. $\frac{3}{4}$. I found first by entring with 49. and 15. (omitting the odde parts) 4. Acres, 2. Roodes, 3. Daywozkes, and 3. Pearches. Now foz the encrease of the Parts of Pearches left out. I must (as I said) reckon them of the length in the breadth, and contrariwise them of the breadth in the length. Halfe 15. $\frac{3}{4}$. is 7. Pearches, and $\frac{7}{8}$. Thzee quarters of 49. is 37. Pearches, $\frac{1}{8}$. Which added, makes 45. Pearches. This adioyned to the number afoze-gotten, bzingeth the whole content of the round figure, which is 4. Acres, 3. Roods, 4. Daywozkes, 3. Pearches, and $\frac{3}{8}$. of a Pearch, the pzoduct of the one fraction multiplied in the other subducted. What must be done when the numbers wherewith ye should enter, exceede your table, counsell the declaration of your table there adioyned.

Of the halfe Circle.

Foz this halfe circle, enter the table with halfe the compasse, & with halfe the Diameter of the circle, oz with the length of the pricked hanging line, k. l. So the content of this halfe Circle is 2. Acres, 1. Roode, 7. Daywozkes, 1. Pearch, and $\frac{12}{15}$. of a Pearch.



To measure halfe circled Land.

Another

Another example of Portions
and parts of a Circle.

SUppose n. m. o. following, were a part of a circle or piece of Land, whose Content ye desired. The whole Compasse of the Circle which this portion representeth, is (as aforesaid) 99. Pearches: his Diameter or breadth 31. $\frac{1}{2}$. The pricked Arke or Compasse, n.m.o. is 74. Now with the halfe Breadth or Semidiameter of the Circle, 15. $\frac{1}{4}$. and with 37. the halfe of the pricked Compasse, enter your Table. So haue ye 3. Acres, 2. Roodes, 5. Dayworkes, 2. Pearches, and $\frac{3}{4}$. of a Pearch, the Content of the piece of Land full of prickes, to the sides of the Triangle pricked.

To measure parts of circled Land.

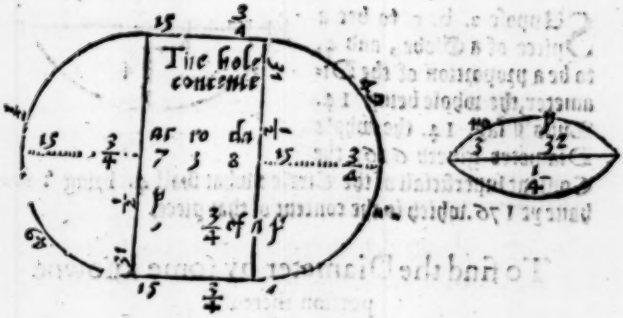
If ye desire to know the sum of Pearches in the other portion beneath the Triangle, separated by the Line m. o. ye must adde the Content of the Triangle (which is 3. Roodes and $\frac{3}{4}$. of a Pearch, found by the Rule of Triangles) to the Acres and Pearches before searched. So haue ye 4. Acres, one Roode, 5. Dayworkes, three Pearches, and $\frac{1}{2}$. of a Pearch. This substracted or pulled from the number contained in the whole Circle, the remaine is the Pearches included in the small piece beneath the Triangle: That is, 1. Roode, 36. Pearches, and $\frac{1}{2}$. of a Pearch.

How mixed Figures are measured.

Land compounded of circles, or his parts.

I Thinke none now will doubt how these two figures following are measured, because they are made of portions or parts of Circles, whose measure is before sufficiently opened

ned. the one consisting of two halfe Circles, and a Quadrangle: the other being the portions of the Circle, m.o. doubled.



If any euill fashioned Land chance to be measured, which requireth to bee brought into many Triangles, to saue labour, yee may adde some portion vnto that, and make it square, or otherwise. So let it then bee measured: and after, from the product pull away that yee added: the remaine is the Content.

To finde the content superficiall of Steeples, Columnes, Globes, and their parts.

To measure Steeples, Columnes, Globes, &c.

TO the Arithmetician, I say: for picked Steeples, multiplie the whole side in halfe the Circumference of the Base, adding the plaine of that Base. For pillers: augment the Circumference of the Base in the Heights, putting to the plaine of both bases. For Globes, the diameter in the Circumference multiplied. Euen so of fragments or parts. Let them that be voide of Arithmetike enter my Table of account following, with such numbers as I now willed the Arithmetician to multiplie, not forgetting what I haue before written. So I serue their turne.

Or thus by the rule of proportion, the parts of a Globe are found.

To measure parts of Globes.

Suppose a. b. c. to bee a piece of a Globe, and 4. to be a proportion of the Diameter, the whole being 14. Thus I say, 14. the whole Diameter giueth 616. the Content superficiall of the Circle: what shall 4. bring? So haue ye 176. which is the content of that piece.

To find the Diameter by some knowne portion thereof.

To finde the vnknowne Diameter of a Globe.

If ye be ignorant what length the Diameter of the Globe is, whose proportion ye haue, the height or part of the Demeriens being 4. foote, augment halfe the line a.b. which is 6. ½. in himselfe, and the product diuide by 4. So haue ye 10. to be aded to 4. which maketh 14. the whole Diameter.

The true measuring of Mountaines and Valleys.

The vi. Chapter.

To measure Mountaines.

First ye shall measure the circuit of the Foote, or Base of the Mountaine: then the compasse of the Summity or top, adding them together. So shall ye do of the Ascenses, that is, the going vp from the foote to the top, ioyning the measure of the longer & shorter in one. Now take the halfe of the circuit aded, & the halfe part of the Ascenses ioyned, and inter your Table: there shall ye see the Content.

Example

Ensample.

A.b.c. is the mountaine: a.c. the circuit of the Base, being 100. Pearches, b. the top 16. Pearches. Which layed together, make 116. b.c. the one Ascense is 55. Pearches: the other 75. These added make 130. The halfe of the circuits is 58. the halfe of the Ascenses 65. with these two summes yee shall enter your Table of account, where ye shall finde 23. Acres, 2. Roodes, and 10. Pearches, the true content of this figured hill.

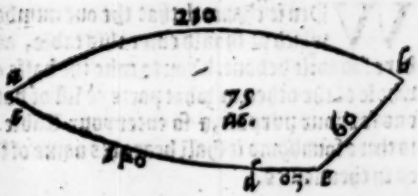
Figure of a Mountaine.

Of the Valley.

As in the Mountaine ye measured the circuit or compasse of the Base or Foote: so here contrary yee shall measure round about the circuite or compasse of the height of the Valley. And as ye got the measure or compasse of the top of the Mountaine, so measure the circuit of the depth of the Valley. In like manner as yee measured the Ascense, that is, the going vp from the foote to the top: so measure the Discense or going downe of the Hill, to the depth of the Valley. The rest all worke, as I haue shewed you in measuring the Mountaine. For more plainnesse, behold this ensample or figure. If ye lay together the circuites of the height & depth, which is 210. and 30. taking the halfe part of these two Circuites, making

To measure Valleyes.

Figure of a Valley.



an 120: then the two Assenses 140. and 60. added in one product 200. the halfe thereof being 100: with this and 120. the other halfe of the Circuite, ye may enter your Table. That doing, loe 75. Acres.

How the Table of account now following, is to be vsed.

What is to bee done when numbers, with which you should enter, exceede your Table.

When you haue gotten a conuenient Length and Breedth, (as I haue aboue declared by diuers Triangles and other figures) then you shall enter this Table. Seeke there the Length, and most number of Pearches in the higher margine, which beginneth at 1. and endeth rightward at 40. Looke the other summe of Pearches (I meane the breedth) in the right side and hanging margine, from 1. descending to 30. Now at the meeting of the lines, where the one answereth the other directly in a square, you shall finde the Acres, Roodes, Day workes, and Pearches. Note that the first number set on the left side, and vpper part in any square, signifieth the number of Acres. The figure 1. set in the vpper part, and right side, doth betoken a Roode: the figure 2. there two Roods. 3. three Roodes. And the figure in the left side beneath, signifieth a Day worke, or Day workes. A figure in the lower part rightward, declareth Pearches.

A Declaration adioyned.

When it chanceth that the one number or both with the which ye should enter this table, are greater then any here found: it behoueth you to take the halfe of the one, and the whole of the other, or what parts ye list of both, most commodious for your purpose, & so enter your Table. Looke then what is there found, and it shall beare his name of the parts multiplied in themselues.

Ensample.

Suppose the number with the which ye should enter your Table to bee 130. Pearches in length, and the breadth 60. neither of these may be found in the margins: wherefore I take the third part of an 130. which is 34. Pearches, and one remaineth.

The halfe 60 that is 30. I finde with entring them at the common meeting, 6. Acres, 1. Roode, and 5. Day workes. This summe must haue his name of the parts augmented in themselues. I tooke the third part of the one, and halfe the other number, therefore 2. must bee multiplied in 3. or contrarie: so haue ye sixe, which signifieth that yee haue found by entring. but the sixth part of the number ye should finde. Wherefore I must take this summe tofore found (being Acres, 1. Roode, and 5. Dayworkes) sixe times as much. So haue yee 33. Acres, & one Roode. For the Pearch remaining in length, reckon him in the breadth (as is afore declared) in the fifth Chapter of the Remaines: so haue ye 60. Pearches more to be added. So the encrease of these two numbers, 103. and 60. amount to 38 Acres, two Roodes and 5. Day workes. Thus any manner length and breadth is reduced to this Table following, which sufficeth.

Looke what I haue shewed in the Chapter of parts, that vnderstand here of whole Pearches, lest substracting, &c.

Thus with few words is ended the certaine measuring of all manner Land, touching the Superficiall Contents. Wherefore now shall follow the true measuring of Timber, Stone, Steeples, Pillers, Globes, according to their Crassitude.

Such as are altogether ignorant of Arithmetike, may reckon by our English coyne, allowing for euery Pearch in length or breadth a penny, and so euery Parke makes an Acre, euery Noble halfe an Acre, euery forty pence or halfe Noble, a roode, and euery penny a square Pearch. And so by memorie without Tables, may in some rude and grosse manner, cast vp reasonable iust the true contents of all Closes, Pedowes, Parches, Hils or Valleys.

TO THE READER.

IT commeth commonly to passe, that Carpenters, Masons, and such like Artificers, are put either to measure timber euery way square, or squared logs, broader on the one side then on the other: yea many times mutilate or vnperfect stuffe. Sometimes three, fiue, tenne, or twenty, square in the head, and so through: oftentimes round Stone or timber with hollowed, &c. Afore I shew vnto them what must be done with such pieces of timber or Stone, to get their true measure, my desire shalbe that such Craftsmen will leaue to be heady or selfe willed: yea so greedily to sticke to their corrupted rules, that vtterly they refuse to be taught.

Both learning and experience declareth vnto me, that the grounds which the best of them haue, are false. To open how and where, it needeth not: neither doth it appertaine to instruction, onely it may suffice him that liketh the true way, here to receiue it appointed to him. Yet to satisfie and content him which will not beleeue any such errors or false grounds to bee, I say (and truly) that the Ruler of Timber measure, which the most part of them hath, is not made by right Art: Besides that, their craft in seeking the Square of some Timber is very false. They vse in measuring, to lay the broader and narrower sides together in a summe, and to take the halfe of that number for the Square. Then they seeke this vntrue Square vpon the false Ruler, and so measuring the Timber, they conclude of it vntruely.

As

As this is corrupted, ſo are other Grounds which they take to be infallible. Now to the purpoſe: touching the correction of thoſe Errors, with other not mentioned, whereby true meaſuring may enſue, this way ſhall be taken. After I haue opened how you muſt handle all ſuch faſhioned Timber (as afore is ſpoken of) there ſhall follow a Table in which ye may finde (as I will declare) the Square of any Stone or Timber. That knowne, it is requiſite to haue another Table immediately following, which may appoint to all true Squares from 1. to 6. inches, the iuſt length to make a foote euery way ſquare. With the length agreeable to your Square, your Logge muſt be meaſured. And as oft as ye finde it from the one end to the other of your Timber, ſo oft ye may conclude the foote Square to be contained in that timber Logge, or Stone: that is, ſo many ſquare Feete there to be included. This Table of Timber meaſure ſtandeth in the place of a good Ruler, well decked with true meaſures. By this ye may make or correct Rulers at pleaſure, as after appeareth.

In a Foote ſquare is contained 172. Inches.

Now orderly followeth the true meaſuring of all faſhioned Timber or ſtone aforenamed.

G	42	43	44	45	46	47
m	Partes	Partes	Partes	Partes	Partes	Partes
31	67580	68856	70111	71345	72557	73747
32	67601	77	32	65	77	67
33	23	98	53	86	97	86
34	44	68919	73	71406	72617	73806
35	66	40	94	26	37	25
36	87	61	70215	47	57	45
37	67709	83	36	67	77	65
38	30	69004	56	87	97	84
39	51	25	77	71508	72717	73904
40	73	46	98	28	37	23
41	94	67	70318	48	57	43
42	67815	88	39	69	77	63
43	37	69109	60	89	97	82
44	58	30	80	71609	72817	74002
45	80	51	70401	30	37	21
46	67901	72	22	50	57	41
47	22	93	42	70	76	60
48	44	69214	63	91	96	80
49	65	35	84	71711	72916	74100
50	86	56	70504	31	36	19
51	68008	77	25	51	56	39
52	29	98	45	72	76	58
53	50	69319	66	92	96	78
54	73	40	87	71812	73016	97
55	94	61	70607	32	36	74217
56	68114	82	28	53	55	36
57	35	69403	48	73	75	56
58	56	23	69	93	95	75
59	78	44	90	71913	73115	95
60	99	65	70710	33	35	74314

G	48	49	50	51	52	53
min	Partes	Partes	Partes	Partes	Partes	Partes
1	74333	75490	76623	77732	78818	79881
2	53	75509	41	51	36	98
3	72	28	60	69	54	79916
4	92	47	79	87	72	33
5	74411	66	97	77806	90	51
6	31	85	76716	24	78908	68
7	50	75604	35	42	26	85
8	70	23	53	60	44	80003
9	89	42	72	79	61	20
10	74508	61	91	97	79	38
11	28	80	76809	77915	97	55
12	47	99	28	33	79015	73
13	66	75718	46	52	33	90
14	86	37	65	70	51	80107
15	74605	56	84	88	68	25
16	25	75	76902	78006	86	42
17	44	94	21	24	79104	60
18	63	75813	39	43	22	77
19	83	32	58	61	40	94
20	74702	51	77	79	57	80212
21	21	70	95	97	75	29
22	41	89	77014	78115	93	47
23	60	75908	32	33	79211	64
24	79	27	51	52	28	81
25	99	46	69	70	46	99
26	74818	64	88	88	64	80316
27	37	83	77106	78206	82	33
28	57	76002	25	24	99	51
29	76	21	43	42	79317	68
30	95	40	62	60	35	85

G	48	49	50	51	52	53
ſſſ	Partes	Partes	Partes	Partes	Partes	Partes
31	74914	76059	77180	78278	79353	80402
32	34	78	99	97	70	20
33	53	97	77217	78315	88	37
34	72	76116	36	33	79406	54
35	91	34	54	51	23	72
36	75011	53	73	69	41	89
37	30	72	91	87	59	80506
38	49	91	77310	78405	76	23
39	68	76210	28	23	94	41
40	88	29	47	41	79512	58
41	75107	48	65	59	29	75
42	26	66	84	77	47	92
43	45	85	77402	95	64	80610
44	64	76304	20	78513	82	27
45	83	23	39	31	79600	44
46	75203	42	57	49	17	61
47	22	60	76	67	35	78
48	41	79	94	85	52	96
49	60	98	77512	78603	70	80713
50	79	76417	31	21	88	30
51	99	35	49	39	79705	47
52	75318	54	67	57	23	64
53	37	73	86	75	40	81
54	56	92	77604	93	58	98
55	75	76510	22	78711	75	80816
56	94	29	41	29	93	33
57	75413	48	59	47	79811	50
58	32	67	77	65	28	67
59	51	85	96	83	46	84
60	70	76604	77714	78801	63	80901

G	54	55	56	57	58	59
m	Partes	Partes	Partes	Partes	Partes	Partes
1	80918	81931	82920	83882	84820	85731
2	35	48	36	98	35	46
3	52	65	52	83914	51	61
4	70	81	68	30	66	76
5	87	98	85	46	81	91
6	81004	82015	83001	61	97	85806
7	21	31	17	77	84912	21
8	38	48	33	93	27	36
9	55	65	49	84009	43	51
10	72	81	66	25	58	66
11	89	98	82	40	73	81
12	81106	82114	98	56	89	96
13	23	31	83115	72	85004	85910
14	40	48	30	88	19	25
15	57	64	46	84103	35	40
16	74	81	63	19	50	55
17	91	97	79	35	65	70
18	81208	82214	95	51	81	85
19	25	30	83211	66	96	86000
20	42	47	27	82	85111	14
21	59	64	43	98	26	29
22	76	80	59	84213	42	44
23	93	97	76	29	57	59
24	81310	82313	92	45	72	74
25	27	30	83308	60	87	89
26	43	46	24	76	85203	86103
27	60	63	40	92	18	18
28	77	79	56	84370	33	33
29	94	96	72	23	48	48
30	81411	82412	88	39	64	62

G	54	55	56	57	58	59
m	Partes	Partes	Partes	Partes	Partes	Partes
31	81428	82429	83404	84354	85279	86177
32	45	45	20	70	94	92
33	62	62	36	86	85309	86207
34	79	78	52	84401	24	21
35	95	94	68	17	39	36
36	81512	82511	84	32	55	51
37	29	27	83500	48	70	66
38	46	44	16	63	85	80
39	63	60	32	79	85400	95
40	80	77	48	95	15	86310
41	96	93	64	84510	30	24
42	81613	82609	80	26	45	39
43	30	26	96	41	60	54
44	47	42	83612	57	76	68
45	64	58	28	72	91	83
46	80	75	44	88	85506	98
47	97	91	60	84603	21	86412
48	81714	82708	76	19	36	27
49	31	24	92	34	51	42
50	48	40	83708	50	66	56
51	64	57	24	65	81	71
52	81	73	40	81	96	85
53	98	89	55	96	85611	86500
54	81814	82806	7.	84712	26	15
55	31	22	87	27	41	29
56	48	38	83803	43	56	44
57	65	54	19	58	71	58
58	81	71	35	73	86	73
59	98	87	51	89	85701	87
60	81915	82903	67	84804	16	86602

G	60	61	62	63	64	65
m	Partes	Partes	Partes	Partes	Partes	Partes
1	86617	87476	88308	89113	89892	90643
2	31	90	22	27	89904	55
3	46	87504	35	40	17	67
4	60	18	88349	53	30	79
5	75	32	62	89166	43	92
6	89	87546	76	79	89955	90704
7	86704	60	90	92	68	16
8	18	74	88403	89206	81	28
9	33	88	17	19	93	41
10	47	87602	30	32	90006	90753
11	62	16	44	45	19	65
12	76	30	88458	89258	31	77
13	91	44	71	71	44	89
14	86805	87658	85	84	90057	90802
15	19	72	98	97	69	14
16	34	86	88512	89310	82	26
17	48	87700	25	24	95	38
18	63	14	39	37	90107	90850
19	77	28	52	50	20	62
20	91	42	88566	89363	32	75
21	86906	87756	79	76	45	87
22	20	70	93	89	90158	99
23	35	84	88606	89402	70	90911
24	49	98	20	15	83	23
25	63	87812	33	28	95	35
26	78	26	47	41	90208	47
27	92	40	88660	89454	20	90959
28	87006	53	74	67	33	71
29	21	67	87	80	46	84
30	35	87881	88701	89493	90258	96

G	60	61	62	63	64	65
m	Partes	Partes	Partes	Partes	Partes	Partes
31	87049	87895	88714	89506	90271	91008
32	64	87909	27	19	83	20
33	78	23	41	32	96	32
34	92	37	54	45	90308	44
35	87107	51	88768	89558	21	91056
36	21	87964	81	71	33	68
37	35	78	94	84	46	80
38	49	92	88808	97	90358	92
39	64	88006	21	89609	70	91104
40	78	20	35	22	83	16
41	92	33	48	35	95	28
42	87206	47	88861	48	90408	40
43	21	88061	75	89661	20	91152
44	35	75	88	74	33	64
45	49	89	88901	87	45	76
46	63	88102	15	89700	90457	88
47	78	16	28	12	70	91200
48	92	30	41	25	82	12
49	87306	44	88954	38	95	23
50	20	88157	68	89751	90507	35
51	34	71	81	64	19	91247
52	48	85	94	77	32	59
53	63	98	89008	89	44	71
54	77	88212	21	89802	90556	83
55	91	26	34	15	69	95
56	87405	40	47	28	81	91307
57	19	53	89060	41	93	19
58	33	88267	74	89853	90606	30
59	47	81	87	66	18	42
60	61	94	89100	79	30	91354

G	66	67	68	69	70	71
m	Partes	Partes	Partes	Partes	Partes	Partes
1	91366	92061	92729	93368	93979	94561
2	78	73	40	78	89	70
3	90	84	51	89	99	80
4	91401	95	61	99	94009	89
5	13	92107	92772	93410	18	99
6	25	18	83	20	28	94608
7	37	29	94	30	38	17
8	91448	41	92805	41	48	27
9	60	92152	16	93451	94058	36
10	72	63	26	61	68	46
11	84	75	37	72	78	94655
12	95	86	92848	82	88	64
13	91507	97	59	92	97	74
14	19	92208	70	93503	94107	83
15	31	20	80	13	17	93
16	42	31	91	23	27	94702
17	91554	42	92902	34	37	11
18	66	92253	13	93544	47	21
19	77	65	24	54	94156	30
20	89	76	34	64	66	39
21	91601	87	92945	75	76	94748
22	12	98	56	85	86	58
23	24	92309	66	95	95	67
24	36	21	77	93605	94205	76
25	91647	32	88	16	15	86
26	59	43	99	26	25	95
27	71	92354	93009	36	34	94804
28	82	65	20	46	44	13
29	94	76	31	57	94254	23
30	91706	92387	93041	67	64	32

G	66	67	68	69	70	71
m	Partes	Partes	Partes	Partes	Partes	Partes
31	91717	92399	93052	93677	94273	94841
32	29	92410	62	87	83	50
33	40	21	73	97	93	60
34	52	32	84	93707	94302	69
35	91763	43	94	18	12	94878
36	75	92454	93105	28	22	87
37	87	65	16	38	31	96
38	98	76	26	93748	41	94905
39	91810	87	37	58	94351	15
40	21	98	93147	68	60	24
41	33	92509	58	78	70	33
42	44	20	69	88	80	42
43	91856	32	79	98	89	51
44	67	43	90	93809	99	94960
45	79	92554	93200	19	94408	69
46	90	65	11	29	18	79
47	91902	76	21	39	28	88
48	13	87	32	93849	37	97
49	24	98	93242	59	47	95006
50	36	92609	53	69	94456	15
51	91947	20	63	79	66	24
52	59	30	74	89	75	33
53	70	41	84	99	85	42
54	82	92652	95	93909	94	51
55	93	63	93305	19	94504	95060
56	92004	74	16	29	13	69
57	16	85	26	39	23	78
58	27	96	37	93949	32	87
59	39	92707	47	59	42	96
60	92050	18	93358	69	94551	95105

G	72	73	74	75	76	77
m	Partes	Partes	Partes	Partes	Partes	Partes
1	95114	95638	96134	96600	97036	97443
2	23	47	42	07	43	50
3	32	55	50	15	50	96
4	41	64	58	22	75	63
5	50	95672	66	30	64	69
6	95159	81	74	37	97071	76
7	68	89	82	45	78	82
8	77	98	90	52	85	89
9	86	95706	98	60	92	95
10	95	15	96205	67	99	97502
11	95204	23	13	74	97106	08
12	12	31	21	82	13	14
13	21	40	29	89	20	21
14	30	95748	37	97	27	27
15	39	57	96245	96704	34	97524
16	95248	65	53	11	97141	40
17	57	73	61	19	48	47
18	66	95782	69	26	54	53
19	74	90	96277	34	61	59
20	83	98	84	96741	97168	97566
21	92	95807	92	48	75	72
22	95301	15	96300	56	82	78
23	10	23	08	63	89	85
24	19	32	16	70	96	91
25	27	40	24	96778	97202	98
26	36	95848	96331	85	09	97604
27	45	57	39	92	16	10
28	54	65	47	96800	23	16
29	62	73	55	07	30	23
30	95371	95881	96363	14	97236	97629

G	72	73	74	75	76	77
m̃	Partes	Partes	Partes	Partes	Partes	Partes
31	95380	95890	96370	96822	97243	97635
32	89	98	78	29	50	42
33	97	95906	86	36	57	48
34	06	14	94	43	64	54
35	15	23	96401	51	70	60
36	95424	31	09	96858	97277	67
37	32	39	17	65	84	97673
38	41	95947	24	72	91	79
39	50	56	32	79	97	85
40	95458	64	96440	87	97304	92
41	67	72	48	94	11	98
42	76	95980	55	96901	17	97704
43	84	88	63	08	24	10
44	93	96	96471	15	31	16
45	95501	96004	78	23	97337	23
46	10	13	86	30	44	29
47	19	21	94	96937	51	97735
48	27	29	96501	44	57	41
49	36	37	09	51	64	47
50	95545	96045	16	58	97371	53
51	53	53	24	65	77	60
52	62	61	96532	96973	84	97766
53	70	69	39	80	90	72
54	79	96077	47	87	97	78
55	95587	85	54	94	97404	84
56	96	94	62	97001	10	90
57	95604	96102	96569	08	17	96
58	13	10	77	15	23	97802
59	21	18	85	22	30	08
60	30	26	96592	97029	97437	14

G	78	79	80	81	82	83
m	Partes	Partes	Partes	Partes	Partes	Partes
1	97820	98168	98485	98773	99030	99258
2	26	73	90	77	34	61
3	32	79	95	82	38	65
4	38	84	98500	86	42	68
5	44	90	05	91	46	72
6	97850	95	10	98795	99050	99275
7	56	98201	15	98800	54	79
8	62	06	20	04	58	82
9	68	12	98525	09	62	85
10	74	17	30	13	66	89
11	97880	22	35	18	99070	99293
12	86	98228	40	98822	74	96
13	92	34	45	27	78	99300
14	98	39	98550	31	82	03
15	97904	45	55	36	86	06
16	10	50	60	40	99090	10
17	16	98255	65	98844	94	13
18	22	61	70	49	98	99317
19	28	66	98575	53	99102	20
20	97934	72	80	58	06	23
21	39	77	85	62	09	27
22	45	98282	89	98866	13	30
23	51	88	94	71	17	99333
24	57	93	99	75	99125	37
25	97963	98	98604	79	25	40
26	69	98304	09	84	29	43
27	75	09	14	98888	33	47
28	80	14	18	92	36	99350
29	86	20	23	97	40	53
30	97992	98325	98628	98901	99144	57

G	78	79	80	81	82	83
m	Partes	Partes	Partes	Partes	Partes	Partes
31	97998	98330	98633	98905	99148	99360
32	98004	36	38	10	52	63
33	09	41	42	14	55	67
34	15	46	47	18	59	70
35	21	51	52	22	63	73
36	27	98357	98657	98927	99167	99376
37	98032	62	61	31	70	80
38	38	67	66	35	74	83
39	44	72	71	39	78	86
40	50	78	76	44	82	89
41	55	98383	98680	98948	99185	99392
42	98061	88	85	52	89	96
43	67	93	90	56	93	99
44	72	98	94	60	96	99402
45	78	98404	99	65	99200	05
46	84	09	98704	98969	04	08
47	89	14	08	73	07	11
48	95	19	13	77	11	15
49	98101	24	18	81	15	99418
50	06	98429	22	85	99218	21
51	12	34	98727	98990	22	24
52	18	40	32	94	25	27
53	23	45	36	98	29	30
54	98129	50	41	99002	33	99433
55	34	98455	45	06	99236	36
56	40	60	98750	10	40	39
57	46	65	55	14	44	43
58	51	70	59	18	47	46
59	57	75	6[illegible]	22	51	99449
60	98162	98480	98761	99025	99256	52

G	84	85	86	87	88	89
m	Partes	Partes	Partes	Partes	Partes	Partes
1	99455	99622	99758	99864	99939	99985
2	58	24	60	65	40	85
3	61	27	62	67	41	86
4	64	29	64	68	42	86
5	67	32	66	70	43	87
6	99470	99634	99768	99871	99944	87
7	73	37	70	73	45	88
8	76	39	72	74	45	99988
9	79	41	74	76	46	88
10	82	44	76	77	47	89
11	99485	99646	99778	99878	99948	89
12	88	49	80	79	49	90
13	91	51	82	80	50	90
14	93	54	83	82	51	99991
15	96	56	85	83	52	91
16	99	99658	99787	99884	99953	91
17	99502	61	89	86	54	92
18	05	63	91	88	55	92
19	08	66	93	90	55	92
20	11	68	95	91	56	99993
21	14	99670	99797	99893	99957	93
22	99517	73	99	94	58	93
23	19	75	99800	95	59	94
24	22	77	02	97	60	94
25	25	80	04	98	61	94
26	28	99682	06	99	99961	99995
27	99521	84	08	99900	62	95
28	34	87	99809	02	63	95
29	36	89	11	03	64	95
30	39	91	13	99904	99964	96

G	84	85	86	87	88	89
m	Partes	Partes	Partes	Partes	Partes	Partes
31	99542	99694	99815	99906	99965	99996
32	45	96	17	07	66	96
33	47	98	18	08	67	96
34	50	99700	20	09	67	97
35	53	03	22	11	68	97
36	99556	05	99823	99912	99969	97
37	58	07	25	13	70	99997
38	61	09	27	14	70	97
39	64	•99711	29	15	71	98
40	67	14	30	17	72	98
41	99569	16	99832	99918	99972	98
42	72	18	34	19	73	98
43	75	20	35	20	74	99998
44	77	99722	37	21	74	98
45	80	25	39	22	75	99
46	99583	27	99840	99924	99976	99
47	85	29	42	25	76	99
48	88	31	44	26	77	99
49	91	99733	45	27	78	99999
50	93	35	47	28	78	99
51	99596	37	99848	99929	79	99
52	98	39	50	30	80	99
53	99601	42	52	31	81	99
54	04	99744	53	32	81	99
55	06	46	55	33	82	99999
56	09	48	99856	99934	99982	99
57	11	50	58	35	83	99
58	99614	52	59	37	83	99
59	16	54	61	38	84	100000
60	19	56	62	99939	99984	100000

I.D. To the Reader.

ALthough (gentle Reader) many, excellent in Geometry, vpon infallible grounds, haue put forth diuers most certaine and sufficient Rules, touching the measuring of all manner Superficies: yet in that the Art of numbring hath been required, yea, chiefly those Rules hid, and as it were locked vp in strange Tongues, they doe profit (or haue furthered) very little the most part: Certes nothing at all, the Landmeater, Carpenter, Mason, wanting the aforesaid. For their sakes I am here prouoked not to hide, but to open, and so encrease the Talent which I haue receiued: yea, to publish in this our Tongue very shortly (if God giue life) a volume containing the flowers of the Sciences Mathematicall, largely applied to our outward practice, profitably pleasant to all manner men in this Realme. In the meane time I shall desire the Artificers aboue named, to bee contented with this little Booke (a taste of my good will towards them) which I wish euen so to further the Readers, as I know it sufficient for the true measuring and ready account of all manner Land, Timber, Stone, Boord, Glasse, Pauement, &c.

Here mine aduice shall bee to these Artificers that will profit in this, or any of my bookes, now published, or that hereafter shall bee, first confusely to reade them thorow, then with more iudgement. Reade at the third reading, wittily to practise: So few things shalbe vnknowne. Note, oft diligent reading, ioyned with ingenious practice, causeth profitable labour.

Thus most heartily farewell (loiuing Reader) to whom I wish my selfe present, to further thy desire and practice in these.

THE PLEASANT PROFIT OR content of this little Booke, and in what it *exceedeth all other publiſhed.*

OTher bookes tofore put forth in our Engliſh tongue, contained onely the bare meaſuring of Land, Timber, and Boord: how agreeable in all places to the rules of Geometrie, let the learned iudge. Here (gentle Reader) thou ſhalt plainely perceiue through diligent reading, how to meaſure truly, and very ſpeedily all manner Land, Timber, Stone, Steeples, Pillers, Globes, Boord, Glaſſe, Pauement, &c. without any trouble: not painted with many rules, or obſcure termes, nor yet with the multitude of tables, as heretofore hath bin: in which not a few errors were committed: for that cauſe no iuſt account might any way be had. Further, ye ſhall by this booke vnderſtand the whole making and comely handling of the Carpenters Ruler, with the true meaſure, &c. And his vſe appointed to the ready meaſuring of all kind of Timber, Stone, Boord, &c. Alſo the leuelling of grounds, and taking of heights, is pleaſantly and diuerſly practiſed by the Ruler. Ye haue here not the common, but the rare vſe of the Squire, applied to heights, lengths, &c. And to the finding of the iuſt houre of the day diuers waies, through the aide of pleaſant Tables newly adioyned to my generall Prognoſtication: by the which the proportion of things, direct or ſquirewiſe ſtanding, are by their ſhadowes knowne.

To conclude, in the end of this Booke is added a Treatiſe, ſhewing the making, and vſe of an Inſtrument, by which yee ſhall get lengths, heights, breadths, wideneſſes, where or howſoeuer they ſtand. Other neceſſarie things are contained in this little volume, which I commit to the diligent Reader.

DIVERS THINGS CONDVCIBLE TO THE ARTE OF MEASVRING.

The first Chapter.

So there are few craftsmen which haue all the kinds of Arithmetike readily: so I doe suppose none so ignorant, but that they doe, or may easily perceiue the simple significations of these characters or figures, 1.2.3.4.5.6.7.8.9.10. And also their strength in the first, second, and third roomes placed. Character numerall.

Besides that, they must be familiar with these and such like fractions.

$\frac{1}{2}$ $\frac{1}{3}$ $\frac{1}{7}$ $\frac{1}{13}$ $\frac{1}{32}$ $\frac{2}{4}$ $\frac{4}{5}$ $\frac{9}{10}$. The first leftward betokeneth one second part of an whole, bee it Pearch, Inch, or any other measure: the next, one third, then one seuenth part: the other ensuing, one sixteenth. So one thirtie and two parts of an Inch. Then follow thzee fourths: foure fifths. The last is nine tenths of an Inch: that is, nine parts of an Inch, diuided into ten portions. Fractions.

These I doe intend to put in my Examples, and in my tables and margins following, to represent parts of Pearches or Inches. As if I would write halfe an Inch, after

this manner $\frac{1}{3}$. Three quarters of an inch thus $\frac{1}{4}$. One eight of a Pearch, on this wise $\frac{1}{8}$. So of the rest.

It is requisit also here to open what a Pearch, a Day worke, a Roode, and an Acre is.

Although there are diuers opinions engendred through long custome in many places, of the length of a Pearch, (vpon which our chiefe matter dependeth) yet there is but one true Pearch by Statute appointed to measure by. Wherein is ordained three Barly cornes drie and round, to make an inch: twelue Inches, a Foote; three Foote, a Yard: fiue Yards, $\frac{1}{2}$. a Pearch: fortie Pearches in length, and foure in breadth, an Acre. So an Acre by statute ought to containe 160. Pearches; the halfe Acre 80. Pearches; a Roode, commonly called a quarter, 40. Pearches, a day worke 4. Pearches. Loe heere the Acre expressed with his length and breadth.

Bredth.	Acre.	Length.
1		160
2		80
4		40
5		52
8		20
10		16

Instruments to measure with Poales, Cord knotted. Profitable staffe.

I must not omit here to tell you what thing is meetest to measure Land with. They vse commonly in the countrey two Poales, either of them the length of a Pearch. They are very good: yet for all kinde of Land, a Cord fiue Pearches in length, well seared with waxe and rosen, knotted or marked at the end of euery Pearch, is more meete and readier. But in my fantasie, the instrument Geometricall, which is put forth in the end of this booke, passeth them all and other, for the exact truth and quickest speed. This Instrument is so generall and auaileable to so sundry things, that it alone requireth a large booke, if it should be sufficiently set forth.

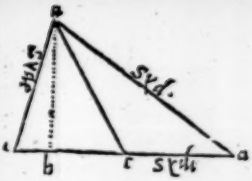
Triangle.

Also I would not haue you ignorant what piece of Land is called a Triangle, which often shall hereafter be named. It is such a fashioned piece as hath (or is imagined to haue) three sides, and three Angles onely: whether the sides be equall or otherwise, as this figure sheweth. Againe, note that a line is said to fall Squirewise, when it cutteth any thing, or any of a Triangle full crosse, like vnto a Squire: As the hanging

Line falling squirewise.

pricked

picked line. a. b. in c. d. the base line of the Triangle. Loe, it cutteth the side squirewise, or full crosse in the point b. and not as the other line a. c. doth. The base of any Triangle is here called that side, which is cut squire wise of the hanging line.



Base line.

Concerning a Circle, know, that the compasse of any Circle is named a Circumference: the middle point in himh, is Center: the right line h.i. that goeth ouerthwart that Center touching the Circumference on both sides is his Diameter: the halfe of that line, the Semidiameter. Also an Arch is a piece of the Circumference cut away: as ye see the Arch above the line f. g. Also f.g.h.i. in this Circle are named paralels: for that they differ equally in al places, the one from the other.

Circle.

Circumference.
Center.
Diameter.
Semidiameter.
Arch.
Parallels.

Note, because practice and experience sheweth me, that there is almost no Land, but it may easily be brought by imagination to a Triangle or Triangles, and so most truly measured: therefore, to be short, this order shall be taken: I will first figure and set afore your eyes Triangled Land, and other which by imagination shall bee brought into Triangles. Then I shall teach the true measuring of them: I meane, how to find a length and bredth, with which ye shall enter the table of account following, where the Acres and odde Pearches (if there be any) shall appeare. As these figures are measured, so all Triangled Land, and other brought into Triangles, of what fashion so euer they bee, shall be measured. And because it is requisite for true measuring of all Triangles, to finde a straight hanging line, I shall shew first how that line is to bee found, imagined, or drawne.

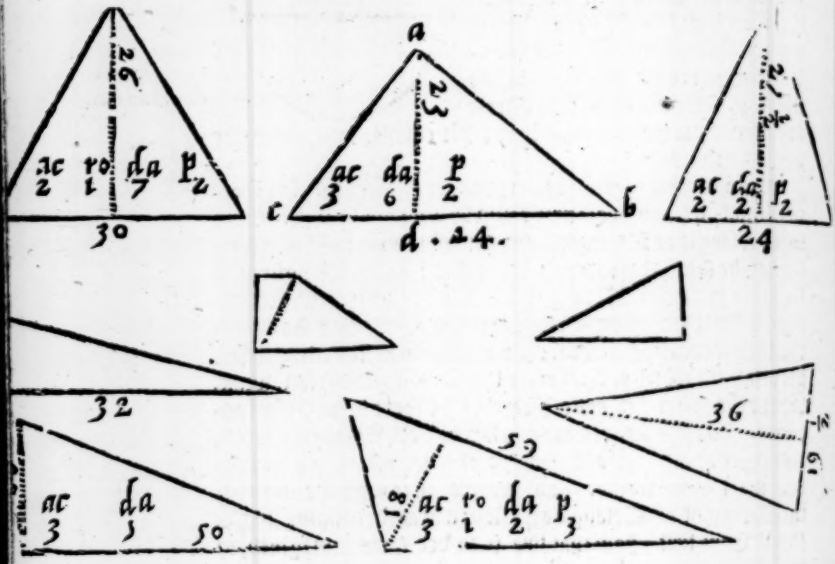
How

How the right hanging line in Triangles is drawne.

The ij. Chapter.

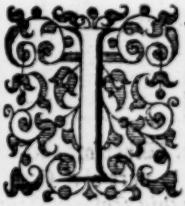
To draw a hanging or plumbe line.

THis straight hanging line in all Triangles is euer drawne or imagined from any Angle, cutting some one side of that Triangle squirewise: as ye may perceiue the pricked lines in the Triangles following. By the helpe of this line, all Lands of Triangle fashion, are brought to bee measured as ensueth.



How Timber or Stone foureſquare *euery way, or broader on the one ſide* then on the other, is meaſured.

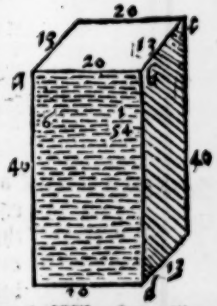
The vij. Chapter.



IF a piece of Timber or Stone, bee either equally ſquare, broader on the one ſide, then on the other, yee ſhall take the iuſt meaſure, I meane, how many Inches the broader ſide containeth: euen ſo of the narrower. This done, yee muſt ſeeke in the Table of ſquares following, the meaſure of the broader ſide of the Timber or Stone, in the vpper margine of that Table. Then looke for the number of Inches, of the equall or narrower ſide, in the right part and hanging Margin. At the common meeting where the one number anſwereth directly to the other, there your true Square ſhal appeare. This Square ſo found, ſhalbe referred to your Table of Timber meaſure: in the which ye may plainely ſee (if you runne downe by the left Margin, vntill your Inches ſquare appeare) how many Feete or Inches of your Ruler belong to a Foote ſquare. As often as that meaſure there found, is contained in the Timber or Stone, ſo often and as many Feete ſquare ye may conclude (without doubt) the piece of Timber or Stone to haue.

Ensample.

Suppose this squared Timber or Stone a. b. c. d. were to be measured, the broader side a. b. 20. Inches, ꝑ narrower side b. c. 13. Inches, the length 40. Inches. Now I must seeke the broader side 20, in the vpper Margine of the table. The narrower side 13, must be found in the right side and hanging Margine. At their common meeting, 16. Inches, and $\frac{1}{8}$. part of an Inch shall appeare. This true square must be searched for in the table of timber measure. Therefore looke for 16. in the Margine of this table. In the Squares with him rightward, ye shall finde 6. Inches, and $\frac{3}{4}$. which is three quarters of an Inch. Some deale lesse of your Ruler then 6. and $\frac{3}{4}$. layd out vpon the timber, maketh a Foote Square. And that measure so directly handled, is contained in the Length of your timber sixe times. Wherefore affirme sixe Foote there to bee, beside that is left $\frac{1}{24}$. part of a Foote. Note because the Squares at all times (in this Ensample) rise not to euen Inches, but sometime to odde parts: therefore according to your discretion, adde or take away some part more or lesse in setting forth the Foote Square, as aboue is performed.



It were intolerable tediousnesse, yea impossible to set forth the true quantities of timber measure, to all odde Quantities of Squares. The discreete handling of these, the wittie shall bring to a sufficient exactnesse.

Of

Of Timber or Stone, 3.5.10.20.or mo sides Square.&c.

The viij. Chapter.

When Timber hath diuers equall Squares in the head, and so through: first measure all the square sides round about the head or end of the Timber. Then take halfe the number of the whole measure for one breadth.

Then measure from the Center (which is the middle of the head, or end of the Timber) to the middest of the Square side, betweene the two Angles, and take the measure of that distance for the other breadth. Now resort with the measures of these two breadths, (as toforе) to the Table of Squares: seeking the bigger number or breadth in the vpper Margine, and the other lesser in the side Margine. With the square there found, haue recourse to the Table of Timber measure, and doe as I haue instructed.

Ensample.

Admit this small piece of Timber fiue square, e. f. g. h. should be measured, euery side being 12. Inches. If ye adde together in one summe all the fiue sides, they make 60. Inches. The halfe is 30: that serueth for one breadth. Then the Line e. f. which goeth from the Center or middest of the Square, to the middle of one side, is 8. Inches. The two numbers 30. and 8. must be sought (as before) in the table of squares following. At the common meeting, your square shall appeare 15. Inches, $\frac{2}{3}$. This square 15. seeke in the Table of Timber measure. Therey e may see right with it 7. Inches, and $\frac{2}{3}$. Now because of $\frac{1}{3}$. the odde quantity of the

Square aboue 15. Inches, lay something lesse. Then see how oftentimes that measure (so with discretion handled) is from the one end of your Timber to the other: and affirme so many times a Foote square there to be, as that measure is found in the length of your Logge.

How round and hollow Timber, Steeples, Pillers, Globes, &c. are to be measured.

The ix. Chapter.

First gird the Logge round about with some Line: then diuide the Line which compasseth that timber into two equal parts: keepe the one part for the bigger breadth. After, ye shall diuide againe that whole length (the two and twenty part cast away) in three parts, and take the halfe of one of them for the other narrower breadth. With the measures of these two breadths, haste to your table, performing all things as afore is opened.

Ensample.

Suppose this little piece of Timber, i.k.l.m. were to be measured, the compasse or girding 36. Inches, and the halfe of that is 18. being the one breadth: then the third of 36. is 12: the halfe of it is 6. which is the other narrower breadth, with these two numbers 6. and 18. enter the Table of Squares following, and so the table of Timber measure. At the last (all things performed as before) ye shall finde in this round Logge, the length l. m. being 18. Inches, 1. Foote, and $\frac{1}{8}$. part of a foote. This is sufficient for all such like.

A note of hollowed Timber.

IF it chance that hollowed Timber be to be measured: measure the whole Logge as though it were not hollow, as aboue is declared. Then measure the narrower and broader side of the hollow, and see what is contained in that, as though it were massie Timber. Now pull out the content of it, from the whole aboue measured: the remaine of force must shew what Timber is included in that hollowed body.

IAm vnable in few words to expresse to the vnlearned, by what meane Pyramidall, or picked regular Steeples of all fashions are measured. Also how Pillers, how the content of Globes or Bowles are searched, vnlesse the Art of numbring were tasted. That being knowne: thus (as now followeth) I teach.

How the crassitude of picked Steeples is knowne.

MUltiply the plaine of the Base in the third part of the Height: so yee haue the Crassitude. Or multiplie the Content superficiall (found as I haue instructed) in the Height of the Steeple, taking for your purpose the third part of that product.

How the Content of Pillers is knowne.

EIncrease the Base plaine in his Altitude or Height: so haue ye your desire.

How the Cubicall bodies of Globes are searched.

The content Superficiall found, (as I haue opened) must be multiplied in the sixth part of the Diameter: the product is that ye require: Or the third part of the superficiall Content in halfe the Diameter. Or multiplie the plaine of the Circle in the whole Diameter: then take two third parts, which added, make the Crassitude.

Of the halfe Circle.

His Superficiall Content multiplied (as I said) bringeth the magnitude of him. If any man require ensamples of these last matters, or more sufficient handling: let them resort vnto my bookes published of Geometrie, where they shall bee satisfied. These little appertaine to Carpenters or Masons: therefore not by ensample declared.

A generall note.

When thou shalt bee put to measure some Body, without order or fashion, lacking part of his Square, or hauing more then his Forme: if it lacke, thou shalt make it perfect, by obseruing diligently the running together of the sides. The parts wanting shall bee measured, as though they were there, which portions must be taken from the whole Body measured.

Also when there resulteth any more then the forme or Regular Square: first measure the square Body: then the Crassitude which aboundeth. All put together, doe shew the whole irregular Bodie. This sufficeth.

A Table to find the iust Radix or Square of any Timber or Stone.

IT behooueth you to know, that this table following is made for the true square of any manner timber: therefore vnderstand that the numbers from 1. to 40. set aboue in the high Pargine, betoken the Inches of the broader side of the Timber. And the numbers from 1. and so downeward to 30. put in the right part and hanging Pargine of this table, signifie the inches of the narrower side: and to conclude briefly, the Element or figures set in euery square roome, betoken the iust square. The bigger figures leftward in euery square place, signifie the whole inches. And the other lesser rightward in the same square diuided by a line, the parts of inches, as $\frac{1}{7}$. &c.

This first Fraction toward the left hand, betokeneth one halfe part of an inch: the other two fifts of an inch, and euerie figure or fraction hauing a point adiopned vnto him, some deale lesse then that part is: as this part, $\frac{1}{2}$ representeth scant halfe an inch, a very little quantity lesse. And if it had two pricks by him, he should haue declared some quantity more: as this other fraction or part, $\frac{2}{5}$: which is more then two fifts, a small deale.

It had not beene needfull to haue put the parts of the Square so precisely as they are here: neither is it requisite so curiously to take them.

TABVLA

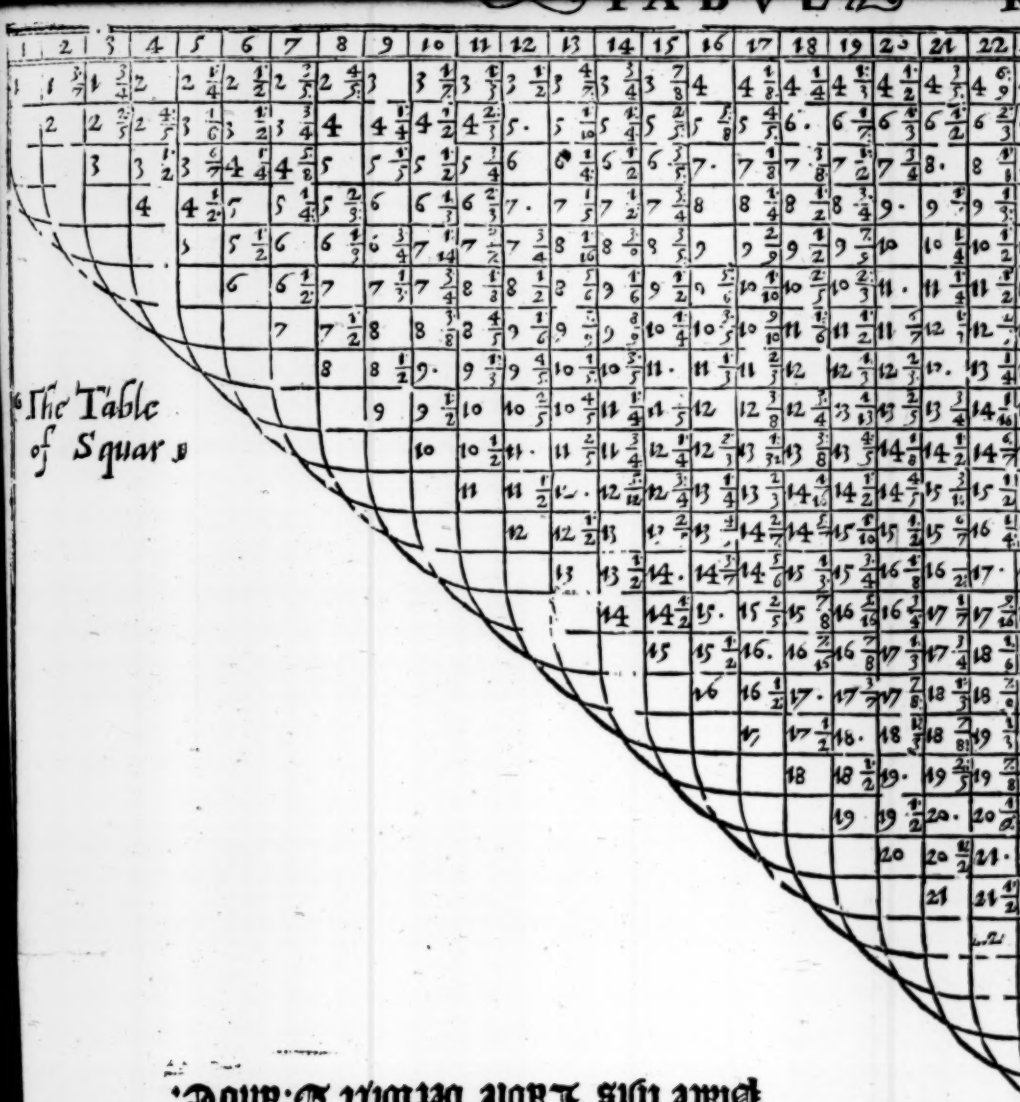
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
1	1 3/7	1 3/4	2	2 1/4	2 1/2	2 2/5	2 4/5	3	3 1/7	3 1/3	3 1/2	3 4/7	3 3/4	3 7/8	4	4 1/8	4 1/4	4 1/3	4 1/2	4 3/5	4 6/9
	2	2 2/5	2 4/5	3 1/6	3 1/2	3 3/4	4	4 1/4	4 1/2	4 2/3	5	5 1/10	5 1/4	5 2/5	5 2/8	5 4/5	6	6 1/7	6 1/3	6 1/2	6 2/3
		3	3 1/2	3 6/7	4 1/4	4 5/8	5	5 1/5	5 1/2	5 3/4	6	6 1/4	6 1/2	6 3/5	7	7 1/8	7 1/8	7 1/2	7 3/4	8	8 1/9
			4	4 1/2	5	5 1/4	5 2/3	6	6 1/3	6 2/3	7	7 1/5	7 1/2	7 3/4	8	8 1/4	8 1/2	8 3/4	9	9 1/5	9 1/3
				5	5 1/2	6	6 1/2	6 3/4	7 1/14	7 5/7	7 3/4	8 1/16	8 3/10	8 3/5	9	9 2/9	9 1/2	9 7/9	10	10 1/4	10 1/2
					6	6 1/2	7	7 1/3	7 3/4	8 1/3	8 1/2	8 5/6	9 1/6	9 1/2	9 5/6	10 1/10	10 2/5	10 2/3	11	11 1/4	11 1/2
						7	7 1/2	8	8 3/8	8 4/5	9 1/6	9 5/9	9 8/9	10 1/4	10 3/5	10 9/10	11 1/6	11 4/7	11 5/7	12 1/7	12 1/2
							8	8 1/2	9	9 1/3	9 4/5	10 1/5	10 3/5	11	11 1/3	11 2/3	12	12 4/7	12 2/3	13	13 1/4
								9	9 1/2	10	10 2/5	10 4/5	11 1/4	11 1/5	12	12 3/8	12 3/4	13 4/13	13 2/5	13 3/4	14 1/16
									10	10 1/2	11	11 2/5	11 3/4	12 1/4	12 2/3	13 1/21	13 3/8	13 4/5	14 1/8	14 1/2	14 6/7
										11	11 1/2	12	12 2/3	12 3/4	13 1/4	13 2/3	14 4/15	14 1/2	14 4/7	15 3/16	15 1/2
											12	12 1/2	13	13 2/5	13 4/7	14 2/7	14 5/8	15 1/10	15 1/2	15 6/7	16 1/4
												13	13 1/2	14	14 5/7	14 5/6	15 1/3	15 3/4	16 1/8	16 2/3	17	17 1/6
													14	14 1/2	15	15 2/5	15 7/8	16 2/15	16 3/4	17 1/7	17 2/15
														15	15 1/2	16	16 2/15	16 7/8	17 1/3	17 3/4	18 1/6
															16	16 1/2	17	17 3/7	17 7/8	18 1/3	18 7/10
																17	17 1/2	18	18 12/13	18 7/8	19 1/3
																	18	18 1/2	19	19 2/5	19 7/8
																		19	19 1/2	20	20 1/2
																			20	20 1/2	21
																				21	21 1/2

The Table of Squares

Plane this Table betwixt B. and C.

RADICVM

21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
4 3/5	4 6/9	4 3/4	5.	5	5 1/10	5 3/16	5 1/3	5 2/5	5 1/2	5 5/9	5 5/8	5 3/4	5 2/10	5 7/8	6	6 1/16	6 1/8	6 1/4	6 1/3	1
6 4/7	6 2/3	6 5/6	7.	7 1/6	7 3/14	7 3/8	7 1/2	7 3/5	7 3/4	7 7/8	8	8 1/8	8 1/4	8 3/8	8 1/2	8 5/8	8 3/4	8 7/8	9.	2
8.	8 1/9	8 5/10	8 1/2	8 2/3	8 7/8	9	9 1/6	9 1/3	9 1/2	9 2/3	9 4/5	10.	10 2/10	10 1/4	10 2/5	10 1/2	10 5/7	10 4/5	11.	3
9 1/7	9 1/3	9 2/9	9 3/4	10	10 1/5	10 2/5	10 3/5	10 4/5	11.	11 1/8	11 1/3	11 1/2	11 3/5	11 4/5	12	12 1/6	12 1/3	12 1/2	12 2/3	4
10 1/4	10 1/2	10 3/4	11.	11 1/6	11 1/3	11 1/2	11 3/4	12 1/24	12 1/4	12 1/2	12 2/3	12 4/5	13 1/26	13 2/9	13 3/8	13 1/2	13 4/5	14.	14 1/5	5
11 1/4	11 1/2	11 3/4	12	12 1/4	12 1/2	12 3/4	13.	13 1/5	13 3/7	13 2/3	13 5/6	14 1/14	14 2/7	14 1/2	14 5/7	15.	15 1/10	15 1/3	15 1/2	6
12 1/7	12 1/3	12 2/9	13.	13 1/4	13 1/2	13 3/4	14	14 1/4	14 1/2	14 3/4	15.	15 1/5	15 2/5	15 2/3	15 6/7	16 1/12	16 1/3	16 1/2	16 3/5	
13.	13 1/4	13 1/2	13 5/6	14 1/7	14 2/7	14 2/3	15.	15 1/4	15 1/2	15 3/4	16	16 1/4	16 1/2	16 3/4	17.	17 1/5	17 3/7	17 1/2	17 6/5	8
13 3/4	14 1/16	14 1/3	14 5/7	15	15 1/4	15 2/3	15 7/8	16 1/7	16 2/3	16 3/4	17.	17 1/4	17 1/2	17 3/4	18	18 1/4	18 1/2	18 3/4	19.	9
14 1/2	14 6/7	15 1/6	15 1/2	15 4/5	16 1/8	16 2/5	16 3/4	17 1/32	17 1/3	17 3/5	17 7/8	18 1/6	18 1/2	18 2/3	19.	19 1/4	19 1/2	19 3/4	20	10
15 3/14	15 1/2	15 6/7	16 1/4	16 3/5	16 7/8	17 1/4	17 1/2	17 6/7	18 1/6	18 1/2	18 3/4	19 1/16	19 1/3	19 5/8	19 6/7	20 1/6	20 3/7	20 3/4	21.	11
15 6/7	16 1/4	16 5/8	17.	17 1/3	17 2/3	18	18 1/3	18 2/3	19.	19 1/4	19 2/3	19 8/9	20 1/5	20 1/2	20 4/5	21.	21 1/3	21 2/3	21 8/9	12
16 2/3	17.	17 1/4	17 2/5	18 1/32	18 3/8	18 3/4	19 1/16	19 3/7	19 3/4	20 1/16	20 2/5	20 3/4	21 1/32	21 1/3	21 5/8	22.	22 1/2	22 1/2	22 3/4	13
17 1/7	17 2/16	18.	18 1/3	18 3/4	19 1/14	19 3/7	19 5/6	20 1/7	20 1/2	20 7/8	21	21 1/2	21 4/5	22 1/8	22 1/2	22 3/4	23 1/16	23 3/8	23 5/8	14
17 3/4	18 1/6	18 2/5	19.	19 3/8	19 3/4	20 1/8	20 2/4	20 7/8	21 1/5	21 5/9	21 9/10	22 1/4	22 5/8	22 7/8	23 1/4	23 3/5	23 7/8	24 1/8	24 1/2	15
18 1/3	18 7/9	19 1/6	19 5/8	20	20 1/5	20 4/5	21 1/6	21 1/2	21 7/8	22 1/4	22 5/8	23.	23 1/5	23 5/8	24	24 1/3	24 2/3	25.	25 1/5	16
18 7/8	19 1/3	19 3/4	20 1/6	20 5/8	21 1/32	21 2/5	21 5/6	22 1/5	22 5/8	23.	23 1/7	23 3/4	24 1/32	24 1/4	24 3/4	25 1/8	25 2/5	25 3/4	26 1/16	17
19 2/5	19 7/8	20 1/3	20 3/4	21 1/5	21 5/8	22 1/32	22 1/2	22 4/5	23 1/4	23 5/8	24	24 3/8	24 3/4	25 1/10	25 1/2	25 3/4	26 1/7	26 1/2	26 3/4	18
20.	20 1/8	20 9/10	21 1/7	21 3/4	22 1/4	22 1/2	22 1/16	22 1/2	23 1/8	23 5/8	24 1/4	24 2/3	25 1/32	25 1/3	25 3/4	26 1/7	26 1/2	26 7/8	27 1/5	19
20 1/2	21.	21 2/7	21 8/9	22 3/8	22 4/5	23 1/4	23 2/3	24 1/16	24 1/2	24 2/3	25 2/7	25 2/3	26 1/13	26 1/2	26 4/5	27 1/5	27 1/2	27 7/8	28 2/7	20
21	21 1/2	22.	22 1/2	22 7/8	23 1/3	23 4/5	24 1/4	24 2/3	25 1/10	25 1/2	25 8/9	26 1/7	26 3/4	27 1/9	27 1/2	27 7/8	28 1/4	28 5/9	29.	21
	22	22 1/2	23.	23 1/2	23 7/8	24 1/8	24 5/6	25 1/4	25 4/5	26 1/8	26 1/2	27.	27 1/3	27 3/4	28 1/7	28 1/2	28 7/8	29 1/4	29 5/8	22
		23	23 1/2	24.	24 1/2	24 7/8	25 1/3	25 7/8	26 1/4	26 3/5	27 1/8	27 1/2	28.	28 3/8	28 5/8	29 1/6	29 4/5	30.	30 1/5	23
			24	24 1/2	25.	25 1/2	25 7/8	26 3/8	26 4/5	27 1/4	27 3/4	28 1/7	28 1/2	29.	29 5/8	29 4/5	30 1/5	30 3/5	31.	24
				25	25 1/2	26.	26 1/2	26 7/8	27 1/5	27 4/5	28 1/4	28 3/4	29 1/6	29 1/5	30	30 1/5	30 4/5	31 1/2	31 5/8	25
					26	26 1/2	27.	27 1/2	27 4/5	28 1/8	28 3/4	29 1/5	29 1/2	30 1/7	30 1/2	31.	31 1/2	31 7/8	32 1/4	26
						27	27 1/2	28.	28 1/2	28 7/8	29 1/5	29 4/5	30 1/4	30 3/4	31 1/6	31 3/5	32 1/32	32 1/2	32 7/8	27
							28	28 1/2	29.	29 1/2	29 7/8	30 1/3	30 7/8	31 1/4	31 3/4	32 5/16	32 5/8	33 1/3	33 2/3	28
								29	29 1/2	30.	30 1/2	30 7/8	31 1/8	31 7/8	32 1/16	32 3/4	33 1/5	33 5/8	34 1/16	29
									30	30 1/2	31	31 1/2	32.	32 5/8	32 7/8	33 1/3	33 5/8	34 1/5	34 5/8	



The Table of Squares

Make this Table betwixt B. and C.

21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	
4 3/5	4 6/9	4 3/4	5.	5	5 1/10	5 3/16	5 1/3	5 2/5	5 1/2	5 2/3	5 5/8	5 3/4	5 4/5	5 7/8	6	6 1/16	6 1/8	6 1/4	6 1/3	1
5 4/7	6 2/3	6 5/6	7.	7 1/6	7 1/14	7 3/8	7 1/2	7 2/5	7 3/4	7 7/8	8	8 1/8	8 1/4	8 3/8	8 1/2	8 5/8	8 3/4	8 7/8	9.	2
8.	8 1/9	8 5/18	8 1/2	8 2/3	8 7/8	9	9 1/8	9 1/2	9 1/2	9 2/3	9 4/5	10.	10 1/10	10 1/4	10 2/5	10 1/2	10 3/7	10 4/5	11.	3
9 2/7	9 1/3	9 1/2	9 3/4	10	10 1/7	10 1/5	10 3/5	10 4/5	11.	11 1/8	11 1/3	11 1/2	11 3/5	11 3/4	12	12 1/6	12 1/3	12 1/2	12 2/3	4
10 1/4	10 1/2	10 3/4	11.	11 1/6	11 1/3	11 1/2	11 3/4	12 1/24	12 1/4	12 1/2	12 2/3	12 4/5	13 1/26	13 2/9	13 3/8	13 1/2	13 4/5	14.	14 1/7	5
11 1/4	11 1/2	11 3/4	12	12 1/4	12 1/2	12 3/4	13.	13 1/5	13 3/7	13 2/3	13 5/6	14 1/14	14 2/7	14 1/2	14 4/9	15.	15 1/10	15 1/3	15 1/2	6
12 1/7	12 2/3	12 2/3	13.	13 1/4	13 1/2	13 3/4	14	14 1/4	14 1/2	14 3/4	15.	15 1/5	15 2/5	15 2/3	15 6/7	16 1/12	16 1/3	16 1/2	16 3/5	
13.	13 1/4	13 1/2	13 5/6	14 1/7	14 1/3	14 2/5	14.	14 1/4	15 1/2	15 3/4	16	16 1/4	16 1/2	16 3/4	17.	17 1/5	17 3/7	17 3/5	17 5/8	8
13 3/4	14 1/16	14 1/3	14 2/7	15	15 1/4	15 2/3	15 7/8	16 1/7	16 2/3	16 3/4	17.	17 1/4	17 1/2	17 3/4	18	18 1/4	18 1/2	18 3/4	19.	9
14 2/7	14 6/7	15 1/6	15 1/2	15 4/5	16 1/8	16 2/5	16 3/4	17 1/3	17 1/3	17 3/5	17 7/8	18 1/6	18 1/2	18 2/3	19.	19 1/4	19 1/2	19 3/4	20	10
15 1/14	15 1/2	15 6/7	16 1/4	16 3/5	16 7/8	17 1/4	17 1/2	17 6/7	18 1/6	18 1/2	18 3/4	19 1/16	19 1/3	19 5/8	19 6/7	20 1/6	20 3/7	20 3/4	21.	11
15 6/7	16 1/4	16 5/8	17.	17 1/3	17 2/3	18	18 1/3	18 2/3	19.	19 1/4	19 2/3	19 8/9	20 1/5	20 1/2	20 4/5	21.	21 1/3	21 2/3	21 8/9	12
16 2/21	17.	17 1/4	17 1/5	18 1/32	18 2/3	18 3/4	19 1/16	19 2/7	19 3/4	20 1/16	20 2/5	20 3/4	21 1/32	21 1/3	21 5/8	22.	22 1/7	22 1/2	22 3/4	13
17 1/7	17 2/21	18.	18 1/3	18 3/4	19 1/14	19 3/7	19 5/6	20 1/7	20 1/2	20 7/8	21.	21 1/2	21 4/5	22 1/8	22 1/2	22 3/4	23 1/16	23 3/8	23 5/8	14
17 3/4	18 1/6	18 2/5	19.	19 3/8	19 3/4	20 1/8	20 1/4	20 7/8	21 1/5	21 5/9	21 9/10	22 1/4	22 5/8	22 7/8	23 1/4	23 1/5	23 7/8	24 1/8	24 1/2	15
18 2/3	18 7/8	19 1/6	19 5/8	20	20 1/5	20 4/5	21 1/6	21 1/2	21 7/8	22 1/4	22 5/8	23.	23 1/5	23 5/8	24	24 1/3	24 2/5	25.	25 1/5	16
18 7/8	19 1/3	19 3/4	20 1/6	20 5/8	21 1/32	21 2/5	21 5/6	22 1/5	22 5/8	23.	23 1/3	23 3/4	24 5/32	24 5/8	24 3/4	25 1/16	25 2/5	25 3/4	26	17
19 2/5	19 7/8	20 1/3	20 3/4	21 1/5	21 5/8	22 1/32	22 1/2	22 3/4	23 1/4	23 5/8	24	24 3/8	24 3/4	25 1/10	25 1/2	25 3/4	26 1/7	26 1/2	26 3/4	18
20.	20 4/9	20 2/45	21 1/3	21 3/4	22 1/4	22 5/16	22 1/2	23 1/16	23 1/2	23 7/8	24 4/5	24 2/3	25 1/32	25 1/3	25 3/4	26 1/7	26 1/2	26 7/8	27 1/5	27 1/2	19
20 4/7	21.	21 5/7	21 8/9	22 1/8	22 4/5	23 1/4	23 2/3	24 5/16	24 1/2	24 5/6	25 1/7	25 2/3	26 1/8	26 1/3	26 4/5	27 1/5	27 1/2	27 7/8	28 1/7	20
21	21 4/9	22.	22 1/2	22 7/8	23 1/3	23 4/5	24 1/4	24 2/3	25 1/10	25 1/2	25 8/9	26 1/3	26 3/4	27 1/9	27 1/2	27 7/8	28 1/4	28 5/8	29.	21
	22	22 1/2	23.	23 1/2	23 7/8	24 1/8	24 5/6	25 1/4	25 1/2	26 1/8	26 1/2	27.	27 1/7	27 3/4	28 1/7	28 1/2	28 7/8	29 1/8	29 5/8	22
		23	23 1/2	24.	24 1/2	24 7/8	25 1/3	25 7/8	26 1/4	26 5/8	27 1/8	27 1/2	28.	28 3/8	28 5/8	29 1/6	29 3/5	30.	30 1/5	23
			24	24 1/2	25.	25 1/2	25 7/8	26 1/8	26 4/5	27 1/4	27 3/4	28 1/7	28 1/2	29.	29 3/8	29 4/5	30 1/5	30 3/5	31.	24
				25	25 1/2	26.	26 1/2	26 7/8	27 1/8	27 4/5	28 1/4	28 4/7	29 1/6	29 1/5	30	30 1/3	30 4/5	31 1/2	31 5/8	25
					26	26 1/2	27.	27 1/2	27 4/5	28 1/8	28 3/4	29 1/3	29 1/2	30 1/7	30 1/2	31.	31 4/5	31 7/8	32 1/4	26
						27	27 1/2	28.	28 1/2	28 7/8	29 2/5	29 4/5	30 1/4	30 3/4	31 1/6	31 3/5	32 1/32	32 1/2	32 7/8	27
							28	28 1/2	29.	29 1/2	29 7/8	30 1/3	30 7/8	31 1/4	31 3/4	32 5/16	32 5/8	33 1/3	33 2/3	28
								29	29 1/2	30.	30 1/2	30 7/8	31 1/8	31 7/8	32 5/16	32 3/4	33 1/5	33 5/8	34 1/16	29
									30	30 1/2	31	31 1/2	32.	32 1/8	32 7/8	33 1/5	33 2/3	34 1/5	34 5/8	

with the declaration and vse of it.

The x Chapter.

THis Table (as ye see) is diuided into two Columnes or Rowes: the one very short the other longer. In the head of the first, I haue put this word Foot: in the second row, Inches, and parts to signifie Feete, Inches, and parts of Inches. The summes in the margine and left part of the first and second columne, declare the quantity of the square of Timber or Stone from 1. to 36. Inches square. Within the rowes you may finde the iust length to a foote square, if ye enter into them in right order according to the square.

Ensample.

SUppose the square of your Timber were 7. Inches, and that yee desired to know what measure or length of the ruler would make a foote square: seeke in the left margine, seuen Inches: and with him in that ower toward the right hand, ye shall finde 2. foote 11. Inches, and $\frac{2}{7}$. of an Inch. Note because the fraction $\frac{2}{7}$ hath a pricke by him, it betokeneth some small quantity lesse then $\frac{2}{7}$ of an inch. If it had 2. prickes or points thus: $\frac{2}{7}$ it should signifie some little quantity more. Neither maketh it matter whether ye obseruethis pricking or no, the quantitie is so little to be added or pulled away.

Note what hath been spoken of timber, the same also is to bee vnderstood of stone, likewise to be measured.

Thus is finished the measuring of Timber.
Now ensueth of Boord.

Square Inches	Foote	Inches	Parts
1	144		
2	36		
3	16		
4	9		
5	5	9	5/7
6	4		
7	2	11	2/7
8	2	3	
9	0	21	1/7
10		17	2/7
11		14	4/7
12		12	
13		10	1/7
14		8	1/14
15		7	2/7
16		6	3/4
17		6.	
18		5	1/3
19		4	3/19
20		4	7/16
21		3	11/21
22		3	4/7
23		3	1/4
24		3	
25		2	1/5
26		2	9/26
27		2	5/27
28		2	1/2
29		2	1/29
30		1	11/15
31		1	4/31
32		1	11/32
33		1	5/33
34		1	1/2
35		1	7/35
36		1	1/3

How Tables, Boords, Glasse, or any such like, are measured, according to their length and breadth, onely to the foote square.

The xi. Chapter.

This thing is perfoymed by the helpe of a Table following, diuided in sixe small Tables, and as many Margins. The first and left Margin begnneth at $\frac{1}{4}$, which is one quarter of an Inch, and extendeth to sixe Inches, as yee may plainely perceiue if ye runne downe by that Margine. This hath his Table on the right side adioyning vnto him. The other taketh his beginning at sixe Inches, $\frac{1}{4}$, and endeth at twelue, hauing his proper Table also. The third from 12. $\frac{1}{4}$ to 18. And so from 18. $\frac{1}{4}$ to 24: from 24. $\frac{1}{4}$. to 30. The last Margine is from 30. $\frac{1}{4}$. to 36. and there endeth.

Of this that is said, you may gather that euery Margin hath his Table on his right side. Also you must know that in the top, and beneath, I haue put (as in the Table of Timber measure) these words, Foote, Inch, and parts, to signifie, Feete, Inches, and parts of an Inch. Whensoeuer ye list to measure boord, Glasse, or any other such, with the breadth of it, enter this table, and seek that breadth in his proper margine; there ye shall finde in right order how many Feete, Inches, or parts of an Inch, belong to a Foote square. So often as the measure is in your stuffe, iust as many Feete haue ye in that Boord, or such like. If the breadth exceed this Table, then diuide the breadth in parts, and worke as is and shall be declared. So the ingenious applieth this Table for all manner breadths, most exactly.

Example.

Fo	Yn		Fo	Yn		Yn	Par		Yn	Par		Yn	Par		Yn	Par
1/4	48		6 1/4	1	11 1/21	12 1/4	11 3/4	18 1/4	7	7/8	24 1/4	5	15/16	30 1/4	4	3/4
1/2	24		6 1/2	1	10 1/7	12 1/2	11 1/2	18 1/2	7	4/5	24 1/2	5	7/8	30 1/2	4	5/7
3/4	16		6 3/4	1	9 1/3	12 3/4	11 2/7	18 3/4	7	2/3	24 3/4	5	4/5	30 3/4	4	2/3
1	12		7	1	8 4/7	13	11 1/16	19	7	4/7	25	5	3/4	31	4	5/8
1 1/4	9	7 1/5	7 1/4	1	7 7/8	13 1/4	10 7/8	19 1/4	7	1/2	25 1/4	5	2/3	31 1/4	4	5/8
1 1/2	8		7 1/2	1	7 1/3	13 1/2	10 2/3	19 1/2	7	3/8	25 1/2	5	5/8	31 1/2	4	4/7
1 3/4	6	10 2/7	7 3/4	1	6 4/7	13 3/4	10 1/2	19 3/4	7	2/7	25 3/4	5	5/8	31 3/4	4	1/2
2	6		8	1	6	14	10 2/7	20	7	1/5	26	5	1/2	32	4	1/2
2 1/4	5	4	8 1/4	1	5 3/7	14 1/4	10 3/5	20 1/4	7	1/8	26 1/4	5	1/2	32 1/4	4	1/2
2 1/2	4	9 3/5	8 1/2	1	4 15/16	14 1/2	9 7/8	20 1/2	7	1/33	26 1/2	5	3/7	32 1/2	4	3/7
2 3/4	4	4 2/8	8 3/4	1	4 2/7	14 3/4	9 3/4	20 3/4	6	15/16	26 3/4	5	3/8	32 3/4	4	3/8
3	4		9	1	4	15	9 5/8	21	6	6/7	27	5	1/2	33	4	1/1
3 1/4	3	8 1/3	9 1/4	1	3 4/7	15 1/4	9 3/7	21 1/4	6	4/5	27 1/4	5	2/7	33 1/4	4	1/3
3 1/2	3	5 1/8	9 1/2	1	3 1/7	15 1/2	9 2/7	21 1/2	6	3/7	27 1/2	5	2/9	33 1/2	4	2/7
3 3/4	3	2 2/5	9 3/4	1	2 3/4	15 3/4	9 1/8	21 3/4	6	5/8	27 3/4	5	1/3	33 3/4	4	2/4
4	3		10	1	2 2/5	16	9	22	6	1/2	28	5	1/8	34	4	1/4
4 1/4	2	9 7/8	10 1/4	1	2 1/21	16 1/4	8 6/7	22 1/4	6	1/2	28 1/4	5	3/32	34 1/4	4	3/16
4 1/2	2	8	10 1/2	1	1 3/4	16 1/2	8 3/4	22 1/2	6	3/8	28 1/2	5	1/16	34 1/2	4	1/6
4 3/4	2	6 1/3	10 3/4	1	1 3/8	16 3/4	8 5/8	22 3/4	6	1/3	28 3/4	5		34 3/4	4	1/8
5	2	4 4/9	11	1	1 1/11	17	8 1/2	23	6	1/4	29	5		35	4	1/8
5 1/4	2	3 3/7	11 1/4	1	4/3	17 1/4	8 1/3	23 1/4	6	1/5	29 1/4	4	7/8	35 1/4	4	1/32
5 1/2	2	2 1/9	11 1/2	1	1/2	17 1/2	8 1/5	23 1/2	6	1/8	29 1/2	4	7/8	35 1/2	4	1/16
5 3/4	2	1 1/23	11 3/4	1	2/7	17 3/4	8 3/32	23 3/4	6	1/16	29 3/4	4	5/6	35 3/4	4	1/32
6	2		12	1		18	8	24	6		30	4	4/5	36	4	
Fo	Yn		Fo	Yn		Yn	Par		Yn	Par		Yn	Par		Yn	Par

Ensample.

Suppose I haue a pane of Glasse, or a Boord, whose breadth were 22. inches, $\frac{1}{4}$. the length 16. foote. In the fourth margine, I finde this breadth, 22. and $\frac{1}{4}$. And euen with it in the table rightward, I see 6. inches, $\frac{1}{4}$. So much of my Ruler wanting some small quantity, maketh a foote.

Now because in the length of my boord (which is 16. foote) that measure is found 29. times, and $\frac{2}{3}$. parts: I conclude 29. foote there to be, and two third parts of a foote Square, according to the length and breadth I said (wanting some small quantity) because of the point ioyned to this fraction $\frac{2}{3}$ which is put to diminish the fracion some little thing, as is declared plainely in the other Tables before put forth.

HE that desireth to measure chamber floores, pauements, or such like, let him onely multiply the breadth with the length, so the product sheweth the Content.

Ensample.

IF there were a pauement 100. foot long, and in breadth 50. I must needes conclude (by multiplication of the length in the breadth there to be contained 5000. foote.

Or thus without Arithmetike, when the breadth exceedeth the Table.

DIuide the breadth in parts (as is opened in the Declaration of the table of account) and worke as I haue before instructed. So for pauements all manner waies it seruetb your turne. Of this matter to put forth tables, were superfluous tediousnesse and folly. The ingenious with these few will be satisfied.

The

The Carpenters Ruler.

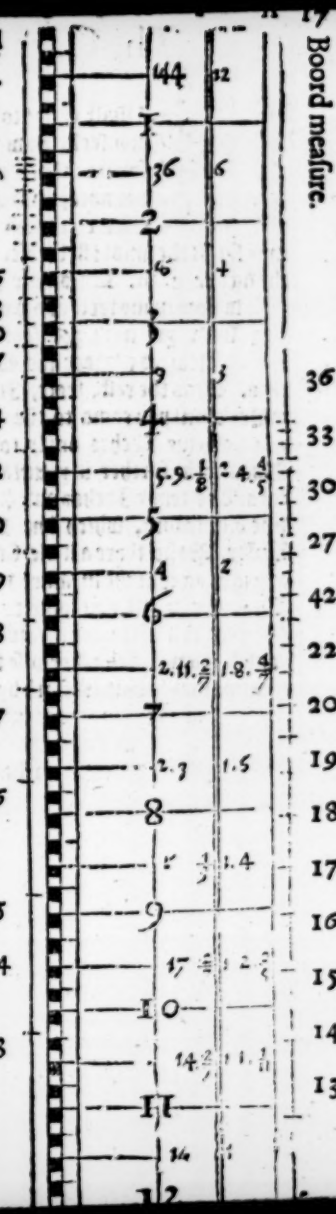
The face of the Carpenters Ruler, figured with the true measures, and other things necessary.

The xij. Chapter.

BEcause the effect of this ruler is aboue declared by tables, an instrument also wel knowne and common among good Artificers, I will not spend many words in opening it. Behold ꝑ figures & learne by thē how ye ought to make, and commonly to decke your Ruler, both with timber and boord measure.

Ensample.

Admit the Ruler to be a. b. c. d. well plained 12. Inches long, a quarter of an Inch thick, & 2. Inches in breadth. Truly it were more commodious, if it had two foote in length. This ruler here imagined, but a foote long is diuided first in 12. euen parts called inches: then euery inch in halfe, or two equall portions: each halfe in two quarters: euery quarter in foure or 2. parts at the least: as in this ensample. Then are the figures placed from 1. to 12. manifesting the inches. Thus your ruler is ready to receiue the measures which are marked or figured on your Ruler thus. Adde first the timber measure as followeth.



YE shall resort to your table of Timber measure, and seeke how many feete belong to one Inch square: there yee shall finde 144. This number note, write, or rather graue, where this figure 1. representing one Inch, is figured as yee may see in the middest betweene the line e. f. and the line of the figure g. h. This done, resort to your table againe, and behold how many feete and parts two Inches square requireth. So shall yee finde 36. foote, which is placed in the next roome leftward, vnder the Character 2. signifying two Inches. Thus the rest, feete, Inches, and parts, found in your table, vntill you come to the 12. Inch, where ye shall perceiue twelue Inches onely to bee set in his proper roome, &c. Then seeke further in your table what belongeth to 13. Inches. Loe tenne Inches and $\frac{1}{7}$. This must be numbred in the line c.d. from c. which line betokeneth the thicknesse of the Ruler. Make there a little strike vpon that grossenesse, euen or right against the measure 10. What neede many words? Thus doe vntill you come to 36. Inches, and that is noted (as the table of timber measure sheweth) right with one Inch and $\frac{1}{7}$. from c. No otherwise is performed of boord measure, as ye may behold set forth by the helpe of his proper table in the Square roomes beneath the line e.f. and also the other thicknesse or line b. a.

The xiij. Chapter.

THis other figure i. k. l. m. is the backside of your ruler, hauing in the middest of Geometricall quadrant n. o. p. q. whose making in few words is thus expressed. The line or breadth of your ruler n.o. the line o.p.p.q.q.n. ought to be of one equall iust length, cutting each other squirewise. And from the center n. vnto p. is drawne another line, which is called the line of height. So is o.n. the line of leuell, q.n. the line of heights vpright. This knowne, I open my compasse, one foote remaining. In the center n. the other extended in the lme of leuell almost to o. making a circumference to q.n. which is a portion of a circle named a quadrant, and ought to bee diuided into 90. equall parts, as ye may behold, euery of them called a degree. Ye may diuide the lines o.p.p.q. named the Scale, each in 12. as here, or in 60. yea in 100. equall portions is more meete for the vse of shadowes, heights, lengths, &c. Note that the side or halfe Scale o.p. is called the contrary shadow p. p. right shadow. Remember that vpon the thicknesse m. k. ye ought to haue two fine equall square sights well bored, represented here by r. s. made of wood, or rather metall to bee fastned there when time requi-

The making of a Geometricall quadrant.

Note these three principal lines.

The line of heights vpright.

The diuided sides o.p. and p.q are called the Scale.

The common vse of the Carpenters Ruler, touching the Face afore put foorth.

The xiiij. Chapter.

The eight Chapter sheweth how the true square is found.

SUppose a piece of timber to bee moaten, whose true square is 7. Inches, this square appointed you to the figure of 7. in the line g. h. vnder whom rightward in the place assigned to Timber measure, is written 2. foote, 11. inches, $\frac{2}{7}$. As often as that measure is found in the length of your timber, so many foote of timber is in that piece.

Another Ensample.

IMagine your Square to be 22. Inches: seeke in the line 2. c. Note then how much of your Ruler is left from that to the end of your Rule c. and so much belongeth to a Foote. Therefore lay out the measure vpon your timber, and reckon how many times ye may finde it, from the one to the other of your Logge: for so many foote of timber is there. Euen thus of boord. Seeke the breeth vpon your Ruler, in the roome or place of boord measure, and immediately before your eyes there remaineth what is to be laid out to make a iust foote of boord.

The vse of the principall lines in the Geometricall Quadrant on the backside of the Ruler, and first of the leuell line.

The xv. Chapter.

IT behooueth you to looke thorow your sights q. n. placed in the thicknesse or line. k. m. a fine thred and plummet falling at liberty out of the Center n. If this plummet and thred chance precisely on the line of leuell (which is n. o. whatsoeuer ye see thorow the sight, is leuell with your eye: if otherwise

wise the thing that yee looke vnto is not leuell, either more or lesse then the height or leuell of your eye: More, if the plummet fall to you-ward: lesse, if contrary.

How by the line of Leuell to foresee, whether the water of any Spring or head is possible to be brought to a place appoynted, and also to iudge the wholesomnesse of it.

The xvi. Chapter.

YE shall goe to the head or Spring, and set your Ruler to your eye (being in height equall with the water) so that the fine cord and plummet fall precisely in the line of leuell. Now, if through the sights yee may see aboue the place, know and iudge the water possible to be brought: if your sight fall vnder, impossible. It commeth commonly to passe, when the place to the which yee would haue water conueyed, is of any great distance from the head, then Hilles, Valleys, and such like impediments, let the line visuall to haue his free course: wherefore this remedy is prouided: At the head of the Spring, yee shall looke thorow the sights (as before) and note a marke in the next Hill toward the place: then goe to the marke: in like manner obserue another in some hill: so forth, vntill by any of them ye may perceiue the place desired. If then your sight running thorow the pinnes of your Ruler (the thred euer falling on the Line n. o.) exceede that place, the conueying of your water is possible. Otherwise not.

Now by the way briefly yee shall be instructed, how yee may know the wholesomnesse of water.

How good water is knowne.

TAke a cleane pot, and put water in it: so set it on the fire: after a little boyling, powre it out: if then no filth re-

maine in the bottome of the pot, it may be iudged the wholesomer. Or thus. Let fall drops vpon metall, or rather on Glasse (any of them being polished) and suffer that to drie by it selfe: if after there remaine no spot or signe, it is a good token. Moreouer if your water be sweete, pure, cleare, light, or of little weight, it followeth, the water to bee wholesome for the vse of man.

Of the Line of height.

WHensoeuer the Thred and Plummet doe chance iustly on the Height, which is n. p. the Altitude or height that ye see, is euen with the distance from the middle of your Foote, to the nether part directly vnder the toppe, equall with your standing, adding the height of your Eye downeward. Know that yee must euer stand vpright with bodie and Necke, your Feete iust together, the one Eye closed, &c.

The line of vpright Altitudes.

IUdge also any thing plumbe vpright, when the thicknesse of your Ruler i. l. is closely thereon, the plummet then at liberty falling on q n. named the Line of Heights vpright. Now followeth the vse of the Scale.

To search out Heights by the Scale,
with the aid of two places.

The xviij. Chapter.

LEt the Thread and Plummet fall in the one, on the 12. poynts; in the other Station, on the 6. of the right shaddow: double the distance betweene the two places, the summitie appeareth from that part of the thing measured, which is equall in Height with your

eye.

eye. Or the one in the 12. the other in 8. of right shadow: then triple the distance. The one in 12. the other in 6. of right Quadruplate, the space. The one in the 12. the other in 6. of the contrarie shadow: then the space betweene both the Stations is equall with that yee measure, euer vnderstanding from your eye vpward. Euen that same commeth to passe, if in the one the Thred bee found vpon the 6. of the contrarie, in the other on the 4. of the same, or the 4. and 3. of the contrarie. In all these the spaces are equall with the Altitudes. So then, in measuring the distance betweene the two places, yee haue the height from your eye vpward, putting to it the length from your sight downeward, the whole altitude appeareth, the Base being equall with your standing.

I would not haue you ignorant here, how to know lengths which be in height not easie to come vnto. For (as before) get the height of the toppe, the Altitude of the Base or longest part of your length. Subduct the lesse height out of the more, of force your desired length remaineth. Or thus: Let the plummet and thread fall in the 12. Marke your place: goe in toward the thing (the thred as it was) vntill yee see the Base of that length: the distance betweene the two standings, is vndoubtedly the Length. How lengths in height are knowne.

How with the Scale direct or vpright heights by their shadowes are declared.

The xix. Chapter.

Turne your left side vnto the Sunne, suffering his Beames to pearce both your sights q.r. placed (afore is sayd) in the thicknesse or line k. m. The Thread or plummet then hanging at liberty, out of the Center n. sheweth as well the Degrees

of height to be counted from o. as the parts of the Scale cut. If your thred be found in the 12. part of line of leuell, shadowes of all things being perpendicular eleuated, are equall with their bodies. If the plummet with the thred be perceiued, cutting the parts next to the sights, which I name poynts of the right shadow, then euery thing direct is more then his shadow, by that proportion which 12. exceedeth the parts, where the thred was found. If it fall in 1. that is the first part of the right shadow, take the shadow twelue times to make the height. In two, that is the second part, fire times, in the third, foure times: in the fourth, three times: in the fifth, twice: and $\frac{2}{3}$. of the shadow, in the sixth, twice, in the seuenth once, and $\frac{3}{4}$. in the eighth once, and $\frac{1}{2}$: in the ninth once, and $\frac{1}{3}$: in the tenth once, and $\frac{1}{8}$: in the eleuenth ye shall take the shadow once, and $\frac{1}{11}$. part of it.

Right shadow. If the Arte of numbring were had, I would will you to multiply the length of the shadow by 12. and the product diuide by the parts, in the which you found the thred.

Contrary shadow. But if it bee in the parts of the contrary shadow, augment the length of the shadow with the parts declared by the plummet: and the increase diuide them by 12. so commeth the altitude also.

Thus the composition and whole appliance of the Carpenters Ruler is shewed: therefore somewhat shall be now said of the Squire.

I am not ignorant that the common vse of him, is better knowne then I can with many words expresse, wherefore I leaue to write in that behalfe. Notwithstanding I will declare how Heights and Lengths are taken, &c. matters rare and knowne of few Artificers.

Also by tables to get a true knowledge of the day-houre, and that diuers waies, with the helpe of the Squire, as is opened in my generall Prognostication, augmented in the yeere of our Lord 1556.

What

What length the sides of thy Squire ought to bee, and the diuision of him.

The xx. Chapter.

I Neede not to put forth the exact making of this Instrument so wel known: Loe therefore the figure: One side supposed two foote from the inward Angle: and the other a iust foote from the same. The longer a.b. inwardly diuided from the Angle a. vnto b. into 24. equall principall parts, and euery of them into a lesse (if ye list) each containing 10. minutes. Also the side c.d. in the outward contrary, plaine from the top c. vnto d. is diuided into 12 euen portions: and againe (if ye require exactnesse) euery of them into 6. each of a value 10. Minutes: Behold a line and plummet falling from e. to f. a Parallell to c.d. and a.b. Thus this squire is well framed for the vse of diuers Tables put forth in my generall Prognostication, and also for the finding of Altitudes and Longitudes, which here I purpose now briefly to open.

How by the Squire heights are knowne.

ALtitudes or heights are found, the line or plummet centred in the first point, cutting h. the middle of a. g. The

moueable sights placed in a. g. or a parallell from that line not vnlike, as is opened of the line of height, in the backe of my Ruler.

How Lengths in plaine Ground are searched by the Carpenters, or Masons Squire.

The xxi. Chapter.

TAke a staffe diuided into certaine portions as yee list, in a 100. or a 1000. parts. At the beginning of your length, vpon the very top directly standing, set the inward Angle of the Squire: lift vp, or put downe this instrument, vntill you see the furthest part of your Longitude, I meane, vntill your sight running from that Angle, to the end of your Squire, come vnto the furthest part of that length. The Squire so remaining, and the Staffe not remooued from his height; marke where the other end of the Squire next vnto you noted vpon the ground. See what proportion the Staffe then beareth to the part of the ground, which the neerest end of the Squire pointed vnto from the Staffe: the same shall the Length haue to the quantitie of the same Staffe.

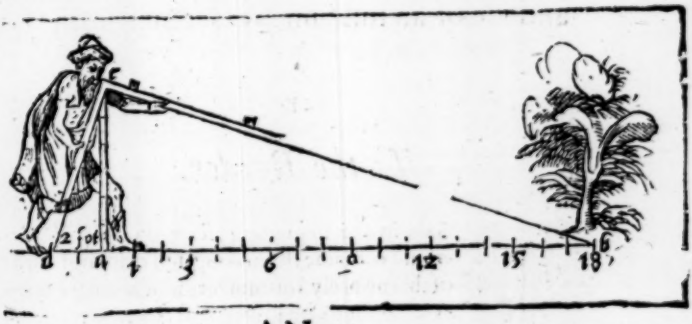
Example.

The cause is taken out of Enclid 33. pro. 1. booke and the 4. pro. 6. booke.

THe Staffe a. c. in this figure is imagined 6. Foote, and the space a. d. 2. Foote. Considering now that 6. the length of the Staffe containeth 2. thrice, therefore the Longitude desired, a. b. of force must containe three times the Staffe (which Staffe is 6. Foote) that maketh 18. Foote. As this is prooued true by a small ground in the figure following: so the arte faileth not in a greater space, which the good

Speculator

Speculator and diligent practizer by any way cannot denie. Yet experience willeth me this to confesse, that the Squire is not cõuenient for any long distance, but the Instrument Geometricall (whose making and vse ye may perceiue in the Treatise following) vnlesse ye ascend some Tree or Turret for your ayde, which length knowne, shall stand in stead of your Staffe.



A Note.

IT behooueth you to haue a fine cord, made fast in the vpper part of your Staffe.c. which shall bee tied euen with the inward edge of the Squire, and so drawne to the ground, where the neere end of the Squire from the Staffe pointed, as yee see d. c. the other end then truly directing to the furthest distance.

Know that the ground must be very plaine and leuell, otherwise error ensueth.

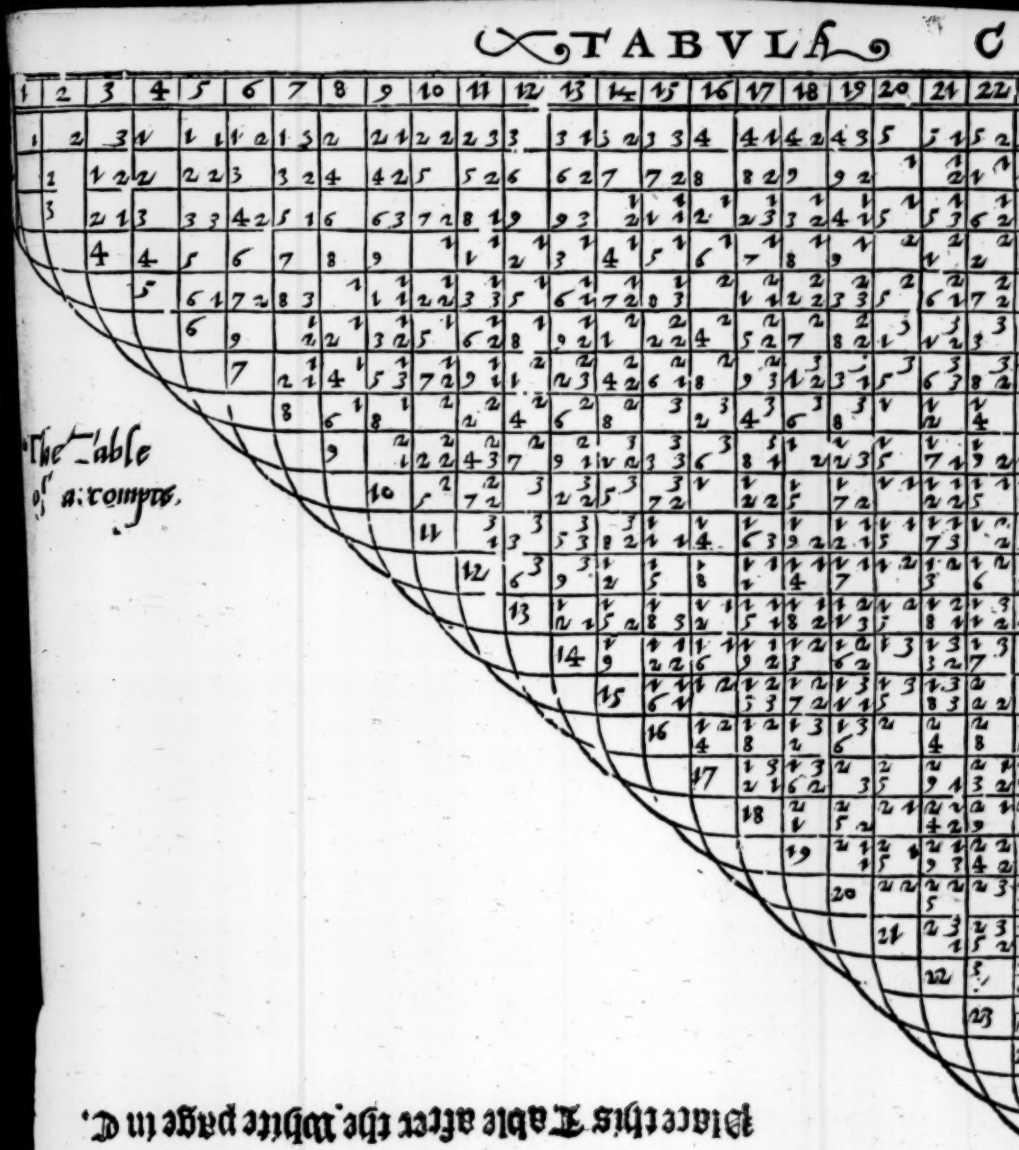
Thus the vse of the Squire is here somewhat declared, but more in my generall Prognostication, yea most plentifully hereafter (God sparing life) in a Booke titled, The rare vse of the Squire in practices Mathematicall. In the which Booke, profitable pleasant experiences shall bee plainly opened (onely of me practised) as well of Perspectiue, as of the Mathematicals in generall.

A little Treatise, declaring the making and vse of an Instrument Geometricall, so farre as it furthereth the Landmeater or Carpenter, named the profitable Staffe.

To the Reader.

I Said in the beginning, that no little Booke would containe the making and manifold fruits of this princely Instrument, if it were set forth as it ought to be in his perfection. Certes the trueth euen here maketh me confesse the same: yea, that there is no Instrument so generall and profitably pleasant: Notwithstanding know (gentle Reader) that the occasion of his chiefe vse and profit is not here ministred: neither, to say the truth, doth it appertaine to, or agree with the capacity of such Artificers. Therefore I shall leaue to intreate of his ample large vse and best making, and will set him forth in few words: yea sufficiently for the Land-meaters capacity or Carpenters purpose, that at the least they may receiue some kinde of fruite with the Geometrer. And in time to come (by other meanes) as I see cause, I will largely declare, and there decke him with his proper beauties. Here now followeth the making, and so briefly, how he is applied for the profit of the aforenamed Artificers.

The



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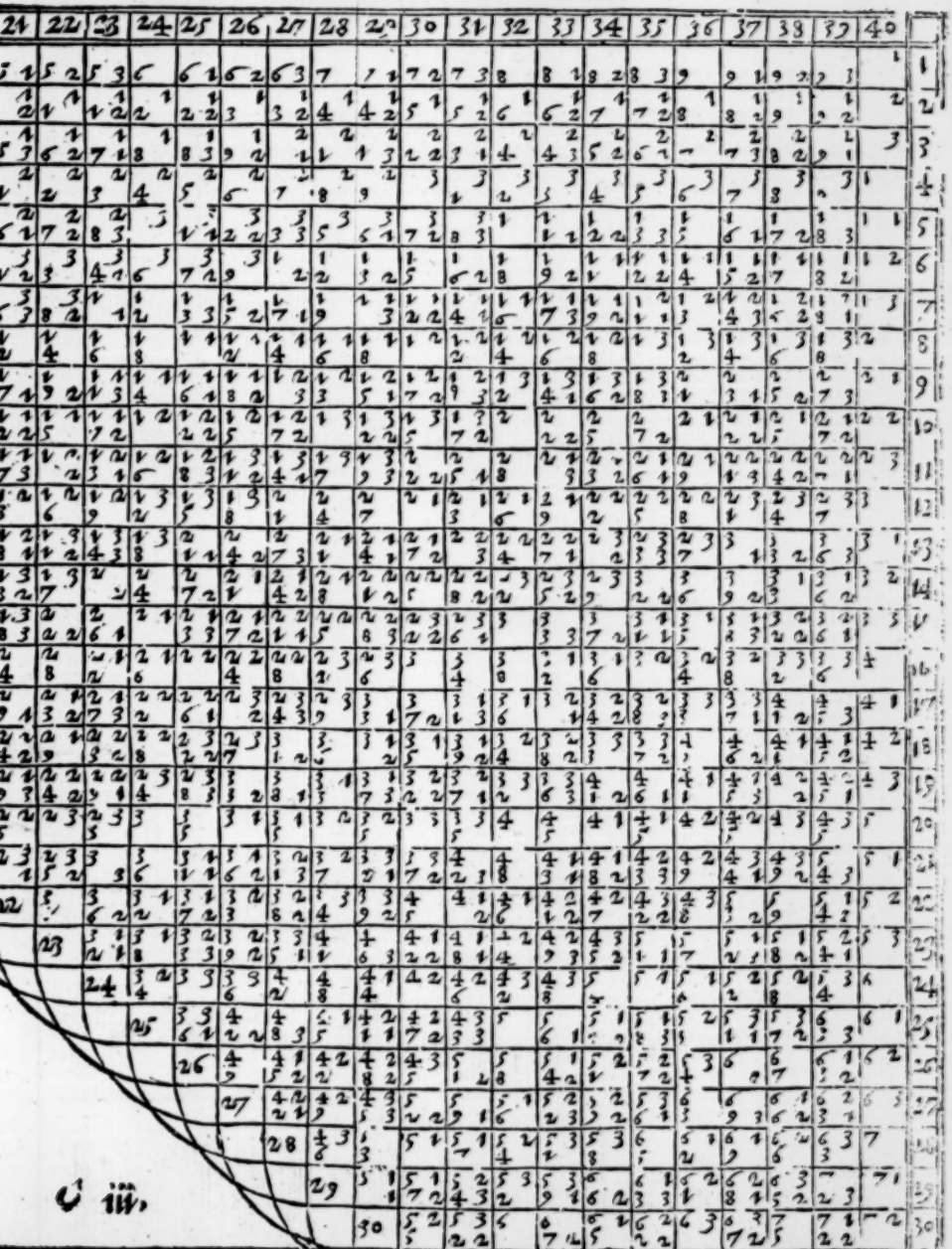
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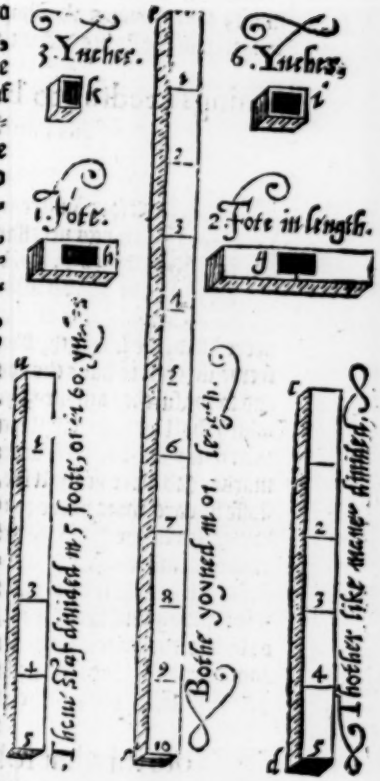
The making of this profitable Rodde or Staffe.

YEe shall prepare two small, straight, stiffe, round, or rather square Rods, of metall or of wood, well plained, of like bigneſſe and length. Although it make no matter of what length, yet to auoyde the errors, which little instruments, and short staues bring, and also to beare with the rude vnwonted handling of such Artificers: let your Rods be each fiue, or at the least three foote, and euery foote diuided in 12. euen parts or Inches, as yee see a.b. and c.d. These Rods must be forged with a vice in the end of them to ioyne readily ten or fixe foote in length, (when time requireth) as the figure e.f. sheweth. Also yee must get (by the helpe of some Craftsman) foure other like Rods, the longer g. 2. Foote: the next h. 1. foote: the other i. 6. Inches, then k. 3. Inches, the last and shortest l. 1. Inch, and ½. Each of these must haue in their middest a hole, that the long staffe of ten foote may bee put thorow them, and they mooued on him at pleasure vp and downe, alwaies cutting the longer staffe e.f. Squirewise, and made to tarry on any diuision, as occasion shall be giuen: which all are easily to be perceiued



by the figure following, although my rude declaration hath not expressed my meaning.

Here note in the stead of your short staues, ye may haue one crosse staffe two foote long, with currant sights, so artificially made, that alwaies the short staffe shall run squire vpon the longer, and the sights distant, as ye list to place them.

Things needfull to be knowne before the vse of this Instrument is opened.

The ij. Chapter.

BEfore I intreate of this vse, it behooueth to know things necessary, and first, which of the fiue little staues g. h. i. k. l. mentioned in the making, is to be put vpon your long staffe e. f. according to the distance of the marke. Note if your marke bee neere hand, be it length, breadth, or height, the longer g. doth seeme meetest to haue the roome, if more of length, the other h. and so the further distance, the shorter the staffe requireth to be, which shall occupy that place. Oft practice sheweth this better then many words. Also note, if chance be to goe in toward your marke, (as after ye shall see how) you must remooue the short staffe inward more neere to the end of the longer e. If yee bee compelled to goe from it, then put it from e. toward the end f. Also remember when ye are appointed to measure any breadth or length (as shall be declared) it behooueth you to stand right with, and against that breadth: yea and the longer the breadth, or larger the widenesse or length is, the better the thing will come to passe. And for heights it is necessary (if yee regard all precisenesse) to haue the height stand directly vp.

Note this that followeth to be generall in all workings.

YE must stand right vp with your Bodie and necke, your feete iust together, your hands not much mooving, the one

eye

eye closed, and euer marke your standing right with the midst of your feete. Be not ignorant here, that I call the extremes of the little staues, the very ends where the sight euer runneth. And no difference betweene the Altitude and height, betweene the Longitude and length: the Latitude and breadth. The short staues I name by the letter figured ouer them. Your eye must euer be placed in the end of the longer staffe c. and with the other eye ye ought to winke.

What these words meane, Longitude, Latitude, Altitude.

These trifles and such like omitted, letteth the trueth to come to passe, and make men to suspect the Ground, which is most certaine.

How heights standing directly vp, are measured by the Instrument.

The iij. Chapter.

PUt the staffe g. vpon the longer c. f. and moue him his iust length from the beginning of the longer c. turne the ends of g. toward you, and according to that height placing your eye (as is said) euer at the beginning of the longer c. with the other eye winke. Then goe backe vntill yee may plainely perceiue the very vpper part of that Altitude, and also the lower end by the extremes of your shorter staffe g. Now the space of the middle of your foote to the base of the height, is equall with the Altitude.

Orthus.

When ye shall see any Altitude, whose measure ye require, imagine by coniecture how oftentimes that height is found in the space from it vnto your standing. Then moue your shorter staffe (chosen as aboue most conuenient) euen as often his owne length from the beginning of the longer c.

where your eye is euer placed. This done, turne the ends of your little staffe, your eye being in e, according to the height: looke whether ye may see by the extremes of your shorter the very top, and also the lowest part of the height. If not, moue the shorter a length further toward f, or neere to e. as yee see cause, and as your coniecture failed. Or let your little staffe remaine, as by coniecture he was put, and goe toward or from that height, vntill the Altitude agree iustly with the extremes of your short staffe. Then marke that place with the middest of your foote.

Now ye may conclude, that the height is as often contained in the distance, which is betweene the marke and it, as the length of that little staffe is found remooued from the end of the longer, &c.

Example.

How the iust height is knowne.

If the short staffe bee ten times his owne length from e. affirme the height contained in that distance ten times onely.

The Altitude is thus gotten. Mooue your short staffe from his late being a length either toward or from e. as ye list to goe in or backe. Then goe fro or neere vnto it (as before) vntill the very summity, and also the lowest part of the height agree with the extremes of your shorter staffe. The space then betweene your marked place and this latter, declareth the iust height. Oftentimes through impediments, yee shall not haue roome to goe so farre backe or forward, as the height commeth vnto.

A remedy prouided for want of ground.

This remedy is prouided: Mooue the little staffe halfe his length, and so seeke two stations (as before) vntill the extreme of the shorter staffe be found iustly to answere either end of the height. Then the space betweene the two standings must bee doubled, to haue the iust height: or if ye list, ye may mooue the shorter, according to the fourth part of his length, or to any portion, as to the fifth, sixth, twentieth, &c. then shall ye haue that part of the height betweene the two stations.

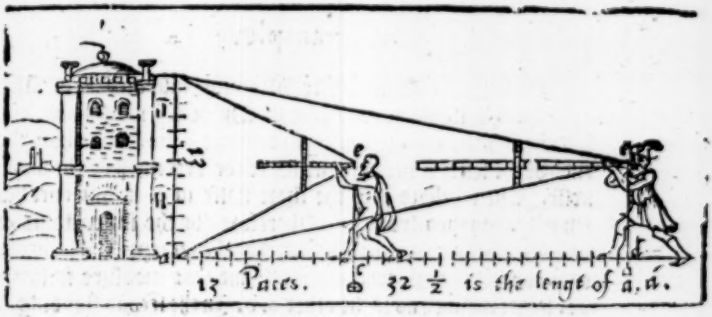
Yet know this (which experience by diligent practice will shew)

shew) the bigger parts yee take, the lesse error yee commit. A little error often multiplied, encreaseth to a great.

Now that all the aforespoken may the better be perceiued, behold the example ensuing, as ye may see by figure declared, in the which the height is imagined a. b. the first station c. the short staffe g. is mooued from e. iust his length. I am forced to conclude, that the Base of the height a. b. is from my standing e. euen his precise length. So then, if ye measure that distance of a. c. being 13. paces, ye haue the true height of a. b. as many. In the other standing place d. the shorter staffe is found from e. twice his length and a halfe, wherefore I must affirme the height a. b. to bee contained or found in the distance a. d. twice and a halfe: which length a. d. is apparant 32. paces. All this that is spoken of the height, may well be vnderstood of Latitudes or widenesses, and lengths following.

The ground of this may be gathered of Euclide in his perspectiue. 21. Theo.

In Altitudes this rule is not perfect, except the eye be leuell with the middle of the Altitude.



How the breadth or widenesse of things are found, and by them, Length or any distance at pleasure.

The iiij. Chapter.

WHatsoeuer I haue instructed afore of heights, the same vnderstand here of widenesse, lengths, &c. For none otherwise are Latitudes or widenesses searched by this Instrument, then before is declared of heights, onely this excepted, that the short staffe must lie contrary, the ends according to the breadth, seeing by the extremes of the short staffe, the very vttermost parts or ends of the Latitude, noting your stations right with the middest of your foote: And so performe all as tofore. And as I said, thereof the parts of the height found betweene your standings, euen the same thing is well vsed here, for all manner parts of the breadth.

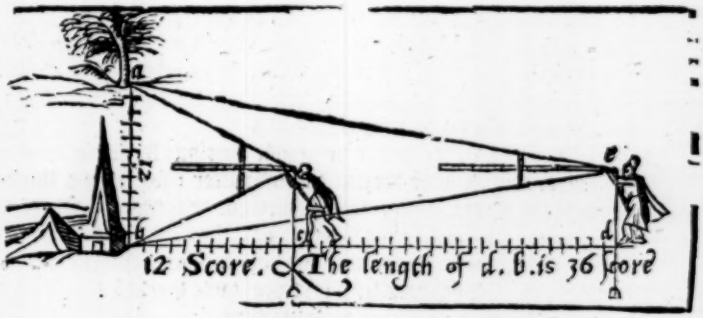
Example.

THe breadth in this figure following supposed a. b. Also the first station c. the next d. My desire is to know the widenesse a. b. and the length or distance d. b. Marke how the ends of the lesser staues are turned to the extremes of the widenesse. Then behold how the short staffe in c. is but once his length remooued from c. Wherefore (by the instructions of heights afore) ye may boldly say, that the widenesse a. b. is but once contained betweene d. and b. and that measure is found 12. score, as much as is the other a. b. In the second standing d. the little staffe is remooued three times his length from c. For that cause I conclude (and truly) from b. to that station three times the breadth, which breadth is 12. score. So by the widenesse I haue found the length of b. d. 36. score, my desire. Thus are Latitudes found, and by them Lengths, &c.

Behold

Behold the Figure.

Ye must alway stand directly against the middle of the Breadth.



Whensoeuer any distance is put, whose certaine length yee require: measure (by the art expressed) either the height of any thing there found, or the breadth, and see how oftentimes that widenesse or length is contained vnto your standing: which knowne, the length cannot bee hid, as is declared.

NOw in few words to conclude, yee may by this Instrument measure the distance of Houses, Steeples, Trees, the length of Walles, the breadth of Ditches, Images in height, and such like. The good wittie Carpenter standing in a place, where hee may plainely see a whole house, or any manner frame with great pleasure, may by this get speedily the true proportion of that house, which he ought to note in a Table, and when time commeth (not without his great praise) may make reare and set vp the like. This I take to be sufficient for these Craftsmen. A more larger vse of this Instrument.

I haue

How the length of land is exactly found.

I haue before forgotten to admonish you whensoeuer ye list to measure any Land exactly, by the instrument Geometricall, named the Profitable Staffe, to set vpright a Rodde, the length of a Pearch. Or if the distance be long, to passe out, or rather iustly mete fiue or moe Pearches at the end or head of your length, the extremes noted with two visible marks. Then goe from thence, and seeke the length by that certaine widenesse, as is declared: so shall ye not faile to bring very true Land. Note that a little error found on the breadth, oft multiplied, encreaseth to a great, yea, to an intolerable fault in the length, therefore the breadth or widenesse ought truly to be searched. This I take sufficient for these Craftsmen.

I would desire where my grosse writings seeme to bee obscure, that I were present the instructer: for truly a liuely voyce of a meane speculator somewhat practised, furthereth tenne fold more in my iudgement, then the finest writer. Farewell. Accept my good will, and looke shortly (if God spare life) for a profitable encrease of these matters.

FINIS.